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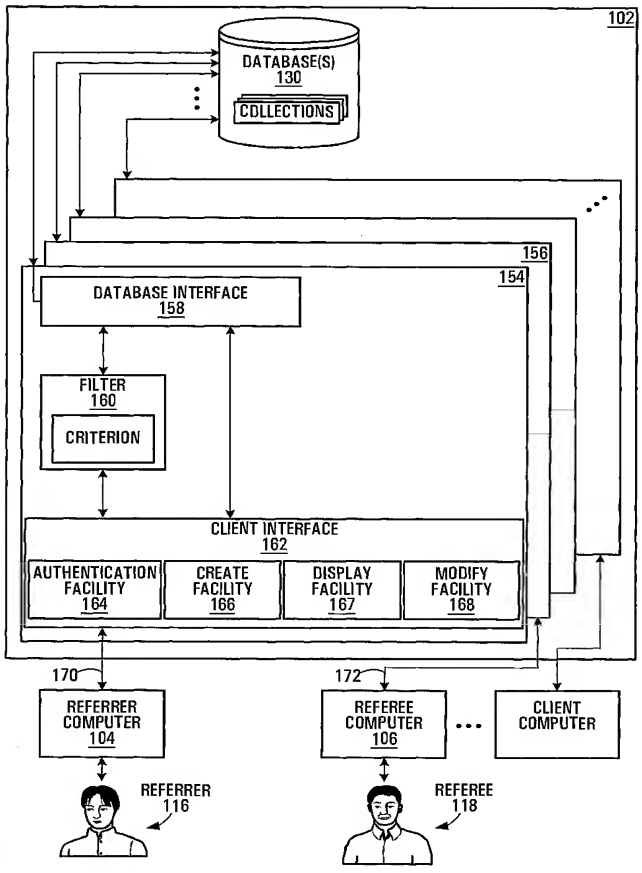

(57) Abstract: A referral information communication and management method, apparatus and system, with related computer-readable media, signals, data-structures and program codes, involving, in response to signals received from respective client computers associated with a referrer and referee of a referral from the referrer to the referee: (1) storing information pertaining to the referral in a database as a collection of linked information units, the information units including a referrer identifier identifying the referrer as originator of the information and a referee identifier identifying the referee as intended recipient of the information, the collection representing the referral and being accessible by the respective client computers; (2) identifying collections of information units that satisfy a criterion, and displaying corresponding identifications at one of the client computers; (3) causing at least one information unit in a collection corresponding to a displayed identification, to be displayed at the client computer; and (4) causing at least one information unit in a collection corresponding to a displayed identification, to be modified.

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REFERRAL MANAGEMENT METHOD, APPARATUS AND SYSTEM

CROSS REFERENCES TO RELATED APPLICATIONS

This application claims priority from United States Provisional Application No. 60/556,379 filed March 26, 2004, incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of Invention

This invention relates to information communication and management, and more particularly, to systems, methods, apparatuses, user interfaces, computer-readable data structures, media and signals, for communicating and managing information associated with referrals between referring and referee parties.

2. Description of Related Art

In many fields, a first party with a client having a problem or need, may be unable to fully service the problem or need. To ensure that the client's problem is fully serviced, the first party may seek assistance from a second party better able to service the problem. Seeking assistance may involve the first party identifying a suitable second party having expertise in addressing the problem, and communicating all the necessary information to the second party, so that the second party may apply its expertise and judgment to address the problem of the first party's client. In addition, the first party may wish to refer the client to the second party for an appointment so that the second party may directly investigate and address the problem, and/or provide information back to the first party to enable the first party to better address the problem. This process, known as a "referral", involves exchanging information regarding the client and the client's problem between the first (referring) party and the second (consulting) party, and may also involve the first (referring) party arranging an appointment between the client and the second (consulting) party. In this process, the first party is an

originator or "referrer" of the referral, and the second party is a recipient or "referee" of the referral.

As will be appreciated, referral processes in many fields involve significant difficulties, for example, in locating a suitable referee for a referral, in tracking relevant information pertaining to the referral (including information about the problem or need at issue), in communicating or exchanging this information between all the relevant parties, and in arranging appointments and/or other follow-up between the referrer, referee and the referral subject (i.e., the client). Moreover, all of these aspects of a referral must be managed in a manner that is appropriate to the nature of the problem or need at issue. In addition, a detailed and accurate record of the progress and results of the referral may need to be accumulated, shared between various parties, and ultimately archived.

In the field of medicine, such referral-related difficulties are especially acute. A referral that is sent from a referring physician or medical doctor (M.D.) to a consulting physician or medical doctor (M.D.) in respect of a patient's medical condition, is typically manually arranged by medical office assistants (MOA's) associated with the physicians, who exchange telephone calls, paper-based forms and/or letters in order to arrange the referral between the physicians. In addition to being inefficient, such an approach to arranging referrals is highly vulnerable to error. It is not uncommon for inappropriate referrals to be sent to a consulting physician, who may eventually refuse the referral or re-refer the patient to a more appropriate consulting physician, thereby wasting both time and money, and possibly inconveniencing or endangering the patient. Even when an appropriate referral is made, the referral may be inadvertently lost or ignored by the consulting physician without any notice of this to the referring physician, who may (falsely) believe that the consulting physician is proceeding apace with the referral. In some cases, it may be discovered—too late—that a sent referral omits critical patient information necessary for the consulting physician to handle the referral (e.g., specific medical test results).

It is well known that, in many respects, current approaches to managing medical referrals are notoriously slow, error-prone, and hence expensive.

Although the prior art has disclosed referral-support systems for electronically transmitting referral information relating to a referral from a referrer to a referee, a number of shortcomings are associated with existing solutions. Many of these systems rely on ordinary email messages to send the referral information to the referee. Unfortunately, systems depending on ordinary email messages may be relatively insecure and vulnerable to viruses and spam, for example. Furthermore, in an email-based referral system, a referrer no longer has access to a email once it has been sent, and therefore is unable to view or modify sent referral information. Of course, the referrer can save a local copy of the sent email in order to facilitate local viewing of sent referral information. However, saving a local copy of the email does not enable the referrer to modify or update any sent referral information *ex post facto*. Furthermore, if upon receiving the sent referral information the referee modifies or updates any of it, such changes or updates will not be reflected in the referrer's local copy of the sent referral information, since the referrer and referee do not share access to the same referral information. Thus, many email-based systems fail to facilitate systematic and ongoing sharing of referral information between a referrer and referee.

SUMMARY OF THE INVENTION

The present invention addresses these and other problems relating to referral management, and may be advantageously applied in many fields including the field of medicine.

Generally, there is provided a referral management system having a secure client-server network architecture, comprising a server communicating with a plurality of client computers, to support referral-related communications from a plurality of referrers to a plurality of referees at respective client computers. A referral from a referrer to a referee is represented in a database by a collection

of linked information units. Each collection is accessible by both its respective referrer and referee in accordance with a prescribed workflow. Advantageously, within limits imposed by the prescribed workflow, parties to a referral can view and modify the current content or status of the collection representing the referral, and thus, ongoing interactive referral-related communication between referrers and referees is integrally supported. Messaging features may also be supported.

Furthermore, the system described provides for the flexible filtering and/or sorting of electronic referrals and messages by a variety of criteria. Electronic referrals may be managed in response to various referral properties, such as referral status (e.g., unread/read, appointment made/pending, added to wait list, cancelled or complete), referral priority (e.g., routine and urgent), and modifications made to the referral (e.g., changes of appointment, changes of wait list status, cancellation and completion), for example. When the referrer or referee changes the properties of an electronic referral, the other party can use the aforesaid filtering features to identify that referral as having been updated.

Moreover, complementary functions for affecting referral properties may be provided to the referrer and referee, thereby effecting a variety of request/response mechanisms between the referrer and referee. For example, the referrer can modify the collection of information units representing the referral to indicate a waitlist request. The referee can then detect the waitlist request by filtering the database for collections that include a waitlist request, for example. The referee can then modify the collection to indicate that the waitlist request was accepted. Similarly, the referee can detect the acceptance of the waitlist request by filtering the database appropriately. Many other useful interactions are possible between the referrer and referee by use of this system.

Generally, significant system events and transactions pertaining to a referral are permanently recorded in association with the referral, and cause notifications to issue to one or more parties to the referral. For example, if one party creates a

new referral, views a new referral, or modifies an existing referral, the other party to the referral may be notified of this event or transaction. Advantageously, detailed and reliable records of referrals are automatically generated by the system for medical and legal purposes, and parties to a referral are automatically apprised of referral progress at significant milestones.

Moreover, the system may include provisions to ensure that a referral includes the information necessary for the referee to handle the referral to reduce incomplete referrals, for example. Other provisions may optionally verify that a referral meets the acceptance criteria for a particular referee to whom the referral is being sent to reduce unwanted or inappropriate referrals, for example.

In accordance with one aspect of the invention, there is provided a method of managing referrals from a referrer to a referee. The method involves: in response to a first set of signals received from a referrer computer, storing, in a database, information pertaining to a referral from the referrer to the referee, the information being stored as a collection of linked information units, the information units including a referrer identifier identifying the referrer as originator of the information and a referee identifier identifying the referee as intended recipient of the information, the collection representing the referral and being accessible by the referrer computer and a referee computer; in response to a second set of signals received from one of the referrer and referee computers, identifying, in the database, collections of information units that satisfy a criterion, and displaying identifications, at the one of the referrer and referee computers, corresponding to respective collections of information units satisfying the criterion; in response to a third set of signals received from the one of the referrer and referee computers, causing at least one information unit in a collection corresponding to a displayed identification, to be displayed at the one of the referrer and referee computers; and in response to a fourth set of signals received from the one of the referrer and referee computers, causing at least one information unit in the collection corresponding to a displayed identification, to be modified.

Storing may involve storing a referral status flag, representing a status of the referral, in an information unit of the collection, and setting the referral status flag to a first value to indicate that the collection has not yet been viewed by the referee. The method may involve setting the referral status flag to a second value if at least one information unit of the collection has been displayed at the referee computer.

The method may further involve (a) facilitating uploading of a file from one of the referrer and referee computers in response to upload signals received therefrom; (b) storing the file in association with a collection associated with both the referrer and the referee; and (c) facilitating downloading of the file to one of the referrer and referee computers in response to download signals received therefrom.

Identifying collections may involve identifying collections having a referral status flag satisfying a referral status criterion.

Identifying collections may further involve establishing the criterion based on at least one of the referrer identifier and the referee identifier. Establishing the criterion may involve setting the criterion to a predefined criterion selected from a set of predefined criteria, in response to a selection signal, in the second set of signals, selecting the predefined criterion, each predefined criterion in the set being based on one of the referrer identifier and the referee identifier.

Identifying collections may further involve identifying collections including at least one of the referrer identifier and the referee identifier.

Causing at least one information unit to be modified may involve setting a modification flag in an information unit associated with the collection corresponding to a displayed identification. Setting the modification flag may

involve storing a modification flag value in the modification flag to represent a modification command received in the fourth set of signals. The method may further involve, if the collection corresponding to a displayed identification is caused to be displayed at one of the referrer and referee computers, resetting the modification flag.

Identifying collections may further involve identifying collections having a modification flag satisfying a modification criterion so that identifications corresponding to collections having information units that have been modified in accordance with the modification criterion, are displayed.

The method may involve presenting, at at least one of the referrer and the referee computers, a representation of the modification flag.

Displaying identifications may involve listing labels respectively associated with the collections. Displaying identifications may further involve using different display parameters for different labels to distinguish at least one label from another, and the method may further involve associating a set of display parameters associated with a selection criterion with labels of collections that satisfy the selection criterion.

Storing may involve storing information including at least one of a client name or identifier, a client date of birth, a need, an urgency status associated with the need, a referrer name, and a referee name.

Storing may further involve producing a class identifier classifying the referral into a pre-defined classification, in response to the first set of signals, and storing the class identifier in an information unit associated with the collection. The method may involve causing at least one question to be presented to an operator of the referrer computer, receiving a response to the at least one question, and producing the class identifier in response to the response to the at least one question.

Identifying collections may include identifying collections that have class identifiers satisfying a criterion. The method may involve causing at least one question to be presented to an operator of the referrer computer and receiving a response to the at least one question, and storing the response to the at least one question in information units associated with the collection. A notification may be caused to be transmitted to the referrer computer when the response to the at least one question does not satisfy a validation criterion.

Displaying identifications may further involve displaying identifications in an order dependent upon at least one information unit in each collection corresponding to a displayed identification.

An event log may be associated with the collection and an entry may be added to the event log in response to occurrence of an event involving modification of at least one information unit of the collection in response to the fourth set of signals. Adding an entry to the event log may involve associating a chronological order indicator and an identification of the event with each other. The identification of the event may include an identification of the referrer or referee computer from which the fourth set of signals was received. The method may involve facilitating viewing of the event log from at least one of the referrer and the referee computers.

The method may involve, in response to receiving the fourth set of signals from the one of the referrer and referee computers, causing a message to be sent to the other of the one of the referrer and the referee computers.

The method may involve transmitting information, including information units from the database and including computer-readable codes, to one of the referrer and referee computers, the computer-readable codes being operable to cause a processor circuit at the one of the referrer and referee computers,

(i) to cause at least some of the transmitted information to be displayed at the one of the referrer and referee computers; and

(ii) to facilitate generation, in response to user input at the one of the referrer and referee computers, of communication signals for transmission from the one of the referrer and referee computers, the communication signals including at least one of the first, second, third and fourth sets of signals.

In accordance with another aspect of the invention, the aforesaid computer-readable codes may be provided. The computer-readable codes may be interpretable by a markup language interpreter.

The third set of signals may include a selection signal indicating selection of the collection corresponding to a displayed indication. Moreover, the third and fourth sets of signals may be the same.

Causing at least one information unit in the collection corresponding to a displayed indication to be modified may involve limiting which information units may be modified according to whether the fourth set of signals are received from the referrer computer or the referee computer.

The method may involve identifying a computer as being associated with the referrer or the referee, in response to a respective referrer or referee key associated with the referrer or referee respectively, received from the computer.

The method may involve linking the identifications with a display interface operable to cause information units in a corresponding collection to be displayed.

In accordance with other aspects of the invention, there may be provided a signal encoded with computer-readable codes for directing a processor circuit

to perform the above method, and/or a computer-readable medium comprising codes for directing a processor circuit to perform the above method.

In accordance with another aspect of the invention, there is provided a computer-generated user interface soliciting responses from a user that are provided to a computer having a memory with computer-executable codes operable to cause the computer to perform the aforesaid method, in response to the responses.

In accordance with another aspect of the invention, there is provided an apparatus to facilitate management of referrals from a referrer to a referee. The apparatus includes: storing provisions, responsive to a first set of signals received from a referrer computer, for storing, in a database, information pertaining to a referral from the referrer to the referee, the information being stored as a collection of linked information units, the information units including a referrer identifier identifying the referrer as originator of the information and a referee identifier identifying the referee as intended recipient of the information, the collection representing the referral and being accessible by the referrer computer and a referee computer; collection identification provisions, responsive to a second set of signals received from one of the referrer and referee computers, for identifying, in the database, collections of information units that satisfy a criterion, and for causing identifications to be displayed at the one of the referrer and referee computers, the identifications corresponding to respective collections of information units satisfying the criterion; information display provisions, responsive to a third set of signals received from the one of the referrer and referee computers, for causing at least one information unit in a collection corresponding to a displayed identification, to be displayed at the one of the referrer and referee computers; and information modification provisions, responsive to a fourth set of signals received from the one of the referrer and

referee computers, for causing at least one information unit in the collection corresponding to a displayed identification, to be modified.

In accordance with another aspect of the invention, there is provided an apparatus to facilitate management of referrals from a referrer to a referee. The apparatus includes a database interface operable to control a database, the database interface being operable to store, in the database, information from a referrer computer, the information pertaining to a referral from the referrer to the referee, the information being stored as a collection of linked information units, the information units including a referrer identifier identifying the referrer computer as originator of the information and a referee identifier identifying a referee computer as intended recipient of the information, the collection representing the referral. The apparatus further includes a filter operable to cause the database interface to identify, in the database, collections of information units that satisfy a criterion, and to cause identifications to be displayed at one of the referrer and referee computers, the identifications corresponding to respective collections of information units satisfying the criterion. The apparatus further includes a client interface cooperating with the database interface and filter and operable to communicate with and be controlled from the referrer and referee computers, the client interface comprising: a referral creation facility operable to facilitate causing the database interface to store the information as the collection in response to signals received from the referrer computer; an information display facility operable to facilitating viewing, from the one of the referrer and referee computers, of at least one information unit in a collection identified by the filter; and an information modification facility operable to facilitate causing a modification, from the one of the referrer and referee computers, of at least one information unit in a collection identified by the filter, wherein the filter is operable to identify the collection when the collection satisfies the criterion and to cause an identification corresponding to the collection to be displayed at the one of the referrer and referee computers.

The database interface, the filter and the client interface may be implemented by a processor circuit. The processor circuit may include a processor and memory in communication with the processor, the memory being encoded with codes for directing the processor to effect the database interface, the filter and the client interface.

The codes may include codes for directing the processor to store a referral status flag in an information unit of the collection and to set the referral status flag to a first value to indicate that the collection has not yet been viewed by the referee. The codes may include codes for directing the processor to set the referral status flag to a second value if at least one information unit of the collection has been displayed at the referee computer.

The codes may include codes for directing the processor to identify, in the database, the collections of information units that satisfy the criterion.

The codes may include codes for directing the processor to identify collections having a referral status flag satisfying a referral status criterion.

The codes may include codes for directing the processor to identify collections including at least one of the referrer identifier and the referee identifier.

The client interface may be further operable to cooperate with the database interface to: (a) facilitate uploading a file, into the database, from one of the referrer and referee computers in response to upload signals received therefrom; and (b) facilitate downloading the file, from the database, to one of the referrer and referee computers in response to download signals received therefrom.

The codes may include codes for directing the processor to store a modification flag in an information unit of the collection and to set the modification flag to a first value to indicate that the collection has not yet been

modified. The codes may include codes for directing the processor to set the modification flag to a second value when the information modification facility is controlled, from the one of the referrer and referee computers, to cause a modification to the collection identified by the filter. The codes may include codes for directing the processor to set the modification flag to a third value when the information display facility is controlled, from the other of the referrer and referee computers, to cause display of the collection identified by the filter. The codes may include codes for directing the processor to store a value in the modification flag, the value representing a modification command received by the information modification facility from the one of the referrer and referee computers.

The codes may include codes for directing the processor to identify collections having a modification flag satisfying a modification criterion so that identifications corresponding to collections having information units that have been modified in accordance with the modification criterion, are displayed.

The codes may include codes for directing the processor to cause a representation of the modification flag to be presented at at least one of the referrer and the referee computers.

The information display facility may cooperate with the filter to cause labels respectively associated with the collections satisfying the criterion to be displayed at the one of the referrer and referee computers using a first set of display parameters. The information display facility may cooperate with the filter to cause labels associated with collections satisfying an additional selection criterion to be displayed at the one of the referrer and referee computers using a second set of display parameters in order to distinguish labels associated with collections which satisfy the additional selection criterion from labels associated with collections that do not.

The collection may include at least one of a client name or identifier, a client date of birth, a need, an urgency status associated with the need, a referrer name, and a referee name.

The referral creation facility may be operable to produce a class identifier classifying the referral into a pre-defined classification in response to receiving the information, the referral creation facility being operable to cause the database interface to store the class identifier in information units associated with the collection.

The client interface may be operable to cause at least one question to be presented to an operator of the referrer computer, to receive a response to the at least one question, and to cause the database interface to store the response.

The client interface may be operable to cause a notification to be transmitted to the referrer computer when the response to the at least one question does not satisfy a validation criterion.

The filter may cause identifications to be displayed in an order dependent upon at least one information unit in each collection corresponding to a displayed identification.

The database interface may be operable to maintain an event log for each collection and the client interface may be operable to cause the database interface to update the event log to add an entry to the event log in response to occurrence of an event involving the information modification facility being controlled from one of the referrer and referee computers to cause a modification to at least one information unit of the collection, wherein the entry includes at least one of a chronological order indicator, an identification of the event, and an identification of the one of the referrer and referee computers from which the modification was caused.

The information display facility may be operable to be controlled from the one of the referrer and referee computers to cause display of the event log thereat.

The information modification facility may respond to receiving the modification command from one of the referrer and referee computers by facilitating sending a message therefrom to the other of the referrer and referee computers.

The client interface may be operable to transmit information, including information units from the database and including computer-readable codes, to one of the referrer and referee computers, the computer-readable codes being operable to cause a processor circuit at the one of the referrer and referee computers,

(i) to cause at least some of the transmitted information to be displayed at the one of the referrer and referee computers; and

(ii) to facilitate generation, in response to user input at the one of the referrer and referee computers, of communication signals for transmission from the one of the referrer and referee computers to the client interface.

The client interface may be operable to receive, from the one of the referrer and referee computers, a selection signal indicating selection of the collection identified by the filter, and to cause the information display facility to cause an information unit of the collection identified by the filter to be displayed at the one of the referrer and referee computers in response thereto.

The apparatus may further include an authentication facility operable to identify a computer from which signals are received as being associated with a user, in response to receiving from the computer a user key associated with a user identifier identifying the user.

The client interface may be further operable to establish the criterion based on the user identifier.

The client interface may be further operable to cause the filter to use, as the criterion, a predefined criterion selected from a set of predefined criteria, in response to a selection signal received from the computer, indicating the predefined criterion.

In accordance with another aspect of the invention, there is provided a data structure facilitating the communication of information pertaining to a referral from a referrer to a referee, the structure comprising a collection of linked information units pertaining to the referral, at least some of the information units of the collection being operable to be modified, the information units of the collection including: a referrer identifier identifying a referrer computer as being originator of the collection, the referrer computer being associated with the referrer; a referee identifier identifying a referee computer as an intended recipient of the collection, the referee computer being associated with the referee; and a modification flag operable to indicate that a modification was made, from one of the referrer and referee computers, to at least one information unit of the collection. The data structure may be encoded on a computer-readable medium.

The information units of the collection may further include an event log operable to store an entry indicating occurrence of an event.

The information units of the collection further include a referral status field operable to indicate a referral status comprising at least one of an unread status signifying that the collection has not been viewed from the referee computer, an appointment set status signifying that an appointment has been set for the referral represented by the collection, a cancelled status signifying that the referral represented by the collection has been cancelled, and a

completed status signifying that the referral represented by the collection has been completed by the referee.

The information units of the collection may further include at least one of a client name or identifier, a client date of birth, a need in respect of which the referral is made, an urgency status associated with the need, a referrer name, and a referee name.

The information units of the collection may further include at least one of a wait list priority field indicating a priority of the referral represented by the collection in a waitlist of the referee, a wait list status field indicating a status of the referral in the waitlist, a waitlist reason field indicating a reason for placing the referral on the waitlist.

The information units of the collection may further include at least one of a referral date sent field, a referral type field, a referral identifier field, a notes field, a client contacted field indicating whether the client was contacted about the referral, a certainty flag for indicating a level of certainty regarding a diagnosis, a referral status field, an appointment time field, a referral reason field, an appointment cancellation reason field, a carbon copy field, a payer field, an attached files status field, and an archived status field.

Other aspects and features of the present invention will become apparent to those ordinarily skilled in the art upon review of the following description of specific embodiments of the invention in conjunction with the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

In drawings which illustrate embodiments of the invention,

Figure **1** is a schematic view of a referral management system according to a first embodiment of the invention, the system including a server and a plurality of client computers communicating therewith;

Figure **2** is a block diagram of the referral management system shown in Figure **1**;

Figure **3** is a schematic representation of a user interface depicting a main menu and a user summary display seen upon successful login into the system of Figure **1**;

Figure **4** is a schematic representation of a patient selection page, produced in response to actuation of a make referral button on the main menu shown in Figure **3**;

Figure **5** is a schematic representation of a selected patient page produced in response to actuation of a link shown in Figure **4**;

Figure **6** is a schematic representation of a referring MD page produced in response to actuation of a continue button on the page shown in Figure **5**;

Figure **7** is a schematic representation of a first consultant information page produced in response to actuation of a continue button on the page shown in Figure **6**;

Figure **8** is a schematic representation of a MD search results page produced in response to actuation of a name link shown in Figure **7**;

Figure **9** is a schematic representation of a second consultant information page produced in response to actuation of a name link shown in Figure **8**;

Figure **10** is a schematic representation of a first problem/procedure selection page produced in response to actuation of a continue button shown in Figure **9**;

Figure **11** is a schematic representation of a second problem/procedure selection page produced in response to actuation of continue button shown in Figure **10**;

Figure **12** is a schematic representation of a notes page produced in response to actuation of a notes & files button shown on in Figure **11**;

Figure **13** is a schematic representation of a referral summary and submission page produced in response to actuation of a summary button shown on the referral menu bar in Figure **12**;

Figure **14** is a representation of a collection of linked information units, representing a referral from a referrer to a referee, and stored at a database of the system shown in Figures **1** and **2**;

Figure **15** is a schematic representation of a display representing incoming referrals to a user of the system shown in Figures **1** and **2**;

Figure **16** is a schematic representation of a display produced in response to selection of a referral represented in Figure **15**;

Figure **17** is a schematic representation of a wait list page produced in response to actuation of a wait list button shown on the referral menu bar in Figures **3** and **15**;

Figure **18** is a schematic representation of a user interface for facilitating the sending of messages by a user of the system shown in Figures **1** and **2**;

Figure **19** is a schematic representation of an incoming messages page produced in response to actuation of an incoming message button show in Figures **15** and **18**;

Figure **20** is a schematic representation of a message page produced in response to actuation of a hyperlink shown in Figure **19**.

Figure **21** is a schematic representation of a user interface for facilitating updating of problems or needs addressed by a user of the system shown in Figures **1** and **2**;

Figure **22A & 22B** are a flow chart illustrating an exemplary series of low-level transactions between a client computer and the server of the system of Figures **1** and **2**;

Figure **23** is a simplified communication flow diagram illustrating a plurality of high-level transactions between a referring party (i.e., referrer) and a consulting party (i.e., referee) in respect of a referral, using the system shown in Figures **1** and **2**.

DETAILED DESCRIPTION

Referring to Figure **1**, a referral management system for facilitating management of referrals from a referrer to a referee, according to a first embodiment of the invention, is shown generally at **100**. Generally, the system includes a referral management apparatus such as a server **102** and a plurality of client computers (e.g., **104**, **106**) operable to communicate with the server using a communication method, which may include a network **108**, such as the Internet, a public-switched telephone network (PSTN), WiFi, Ethernet™, or any other suitable communication method or combination of methods. The network **108** may further include a virtual private network (VPN) or an alternate mechanism for ensuring secure communication between the client computers (e.g. **104**, **106**) and the server **102**. A communication protocol such as TCP/IP or any other suitable protocol may be used to implement network communications. The server **102** includes a processor circuit **110**, which, in this embodiment, includes a memory **112** in communication with a processor **113**, the memory being encoded with codes for directing the processor to effect the functionality of the server as described below. Similarly, each client computer **104**, **106** has a respective processor circuit, which includes a processor and a memory encoded with codes for directing the processor to control the functionality of the respective client.

Although the system illustrated in Figure **1** can accommodate any number of client computers, for ease of illustration, Figure **1** depicts only two client computers, the first computer being a "referrer client computer" **104** associated with a referrer **116** and the second computer being a "referee client computer" **106** associated with a referee **118**. The referrer client computer **104** is used by or on behalf of a referring user to transmit information pertaining to a referral **114**, via the server **102**, to a user at the referee client computer **106**. The user at the referee client computer **106** may be the intended referee **118**, or a person acting on behalf of the intended referee.

For example, the referrer **116,** associated with the referrer client computer **104,** may be a referring physician, such as a general practitioner making medical referrals in respect of his or her patients, and the referee **118**, associated with the referrer client computer **106**, may be a consulting physician, such as a specialist who accepts referrals, including referrals from the general practitioner. Additionally, the system **100** facilitates agents acting on behalf of the referrers and referees. For example, a client computer may be controllable by a medical office assistant (MOA) to send or receive electronic referrals on behalf of a physician with whom the assistant is associated. In some cases, the referrer **116** or the referee **118** may be an institution rather than a person (e.g., a hospital or clinic), and also may have a plurality of agents acting on its behalf.

The embodiments described herein are related to medical referrals, and therefore certain pairs of terms ("referrer" and "referring physician"; "referee" and "consulting physician") are used somewhat interchangeably. However, such usage is not intended to limit the present invention to the medical field. While the particular embodiments described herein to illustrate the invention support medical referrals, the broad principles behind these embodiments could be applied within referral management systems in other fields of endeavour.

A principal user may alternately act as either a referrer or referee in different transactions. Accordingly, a client computer (e.g. **104**, **106**) in this system is typically operable to both send and receive electronic referrals. Thus, the characterizations used herein of a client computer being either a referrer or referee computer should be understood as being descriptive only in respect of particular transactions performed from the client computer involving either the sending or receiving of an electronic referral, respectively. In other words, the same client computer could be characterized as a referrer computer in one transaction but as a referee computer in another.

Similarly, while this description refers to a "referrer" **116** and a "referee" **118** as individuals, operating a "referrer client computer" **104** and "referee client computer" **106** respectively, this is merely to conveniently illustrate embodiments of the invention for particular transactions involving at least one referral **114** originating from the "referrer" **116** and addressed to the "referee" **118**. However, it will be appreciated that such language is illustrative and not limiting. A user may act as a referrer in respect of one referral and as a referee in respect of another. Moreover, any number of users of the system **100** may interact with each other by means of the system. Effectively, the embodiments described are intended for use by a plurality of referrers sending a plurality of referrals to a plurality of referees, such that different referrals may be sent to different referees, and such that some of the referrers may also be referees and vice versa.

In this embodiment, the server **102** utilizes software including an operating system **120**, a database server **122,** and a web server **124.** The operating system **120** may include Microsoft Windows **2000** Server™, the database server **122** may include Microsoft SQL Server™, and the web server **124** may include Microsoft Internet Information Services (IIS)™. The operating system **120** may include the database server **122** and the web server **124**, and other relevant network software such as a firewall **126**, for example. The server **102** may include a file system **128** for storing files accessible by the web server **124.** The file system may support a database **130** and related files accessible by the database server **122**.

The database server **122** is operable to control the database **130**, in response to signals received from the web server **124**. The web server **124** is operable to communicate with the plurality of remote client computers **104**, **106** and to present dynamic web pages **132** thereto. In the embodiment shown, dynamic web pages **132** are Active Server (ASP) pages generated in accordance with computer-readable codes based on ASPX executable files **134** compiled from Visual Basic™ source code using Microsoft .NET™ tools. The dynamic web

pages **132** are operable to cause various displays to be seen at the client computers **104**, **106** and to receive user input therefrom as described herein. A helpful description of ASPX execution is provided in U.S. Patent Application Publication No. US **2004/0029092** A**1,** incorporated herein by reference. It will be appreciated by those skilled in the art that the present system need not be implemented by using ASP pages under the Microsoft .NET™ framework, and that other languages and communication methods could be substituted (such as Java™ for example).

Regardless of whether the functionality of the system described herein is implemented by dynamic web pages or by Java™, or by direct hosting at the server **102**, or by a combination of these or other methods, any implementation will include three main functions including a database interface function, a filter function and a client interface function. Together, each of these functions may be referred to as a set of interdependent services. Each set of interdependent services will be implemented by codes executing on either the server **102** processor **113**, on a processor at the client computer, or both. For example, the codes implementing a given function may be split such that one portion of the codes runs on the server **102** and another portion runs on the client processor **142**. For example, some of the functionality of the system may be implemented by code embedded in dynamic web pages. In the embodiment shown, some of the functionality of the system is implemented by code embedded in ASP pages that are transmitted from the server **102** to the client processor (**142**), for example, for execution at the client processor and some of the functionality of the system is implemented by code executed at the server **102**.

Generally, the software to direct the server **102** to perform the methods of this invention may be received or installed through an I/O interface **136** of the server **102**, and may be communicated, for example, through the network **108**, through a dial-up connection, through a computer-readable signal **138**, or through a computer-readable medium **140** such as a CD-ROM, floppy disk, or

flash memory, for example, encoded with blocks of codes for directing the processor **113** to undertake particular processing steps.

Client computers, such as client computer **104,** generally include a CPU or client processor **142** and memory **144** and require no special software in this embodiment except for a web browser **146** such as Microsoft Internet Explorer™, which may be provided as part of an operating system **152** of the client computer (e.g., Microsoft Windows XP™). The operating system **152** may also include networking software **150** to enable access to a server such as **102** at a remote location. The client computers may have I/O interfaces **148** similar to those of the server **102.**

For ease of explanation, a generic representation of three main functional components of the system is provided in Figure **2.**

Referring now to Figure **2**, the server **102** is configured to invoke respective instances of code **154**, **156** to provide a respective set of interdependent services to each client computer **104**, **106** engaged in a communications session with the server **102**. Each set of interdependent services includes a database interface **158**, a filter **160** and a client interface **162.**

Generally, the database interface **158** is operable to control a database **130** to store, in the database **130,** information from a referrer or referee computer. The information may pertain to a referral from the referrer **116** to the referee **118**. The information is stored in the database **130** as a collection of linked information units including a referrer identifier identifying the referrer client computer **104** (associated with the referrer **116**) as originator of the information, and a referee identifier identifying a referee client computer **106** (associated with the referee **118**) as intended recipient of the information. The collection of linked information units thus represents a referral.

The filter **160** is operable to cause the database interface **158** to identify collections of information units that satisfy a criterion, and to cause identifications of such collections to be displayed at a client computer such as the referrer client and referee client computers **104**, **106**.

The client interface **162** cooperates with the database interface **158** and cooperates with the filter **160** to facilitate viewing and modifying of information stored in the database **130**. The client interface **162** is operable to communicate with and be controlled from the referrer or referee client computers **104**, **106**. The client interface **162** may optionally include an authentication facility **164**, to provide for user authentication before permitting access to the server **102** by an inquiring referrer or referee computer.

The client interface **162** includes a referral creation facility **166** operable to facilitate causing the database interface **158** to store information received from the referrer computer **104**, for example, as a collection of information units in response to signals received from the referrer computer **104**. The client interface **162** further includes an information display facility **167** operable to facilitating viewing, from the referrer and referee client computers **104**, **106**, of at least one information unit in a collection identified by the filter **160**. The client interface **162** further includes an information modification facility **168** operable to facilitate causing a modification, from the referrer and referee client computers **104**, **106** of at least one information unit in a collection identified by the filter **160**.

The client interface **162** is operable to cause communication signals **170** or **172**, encoded with information, to be transmitted from the server **102** to a client computer (e.g., **104** or **106**) The information may include information units from the database **130** and may further include computer-readable codes operable to cause a processor (e.g., **142** in Figure **1**) at the client computer to cause at least some of the transmitted information to be displayed at the client computer. The computer-readable codes may effect a

user interface at the client computer such as a graphical user interface (GUI). The computer-readable codes may be further operable to cause the processor (**142**) at the client computer to facilitate generation of communication signals (also indicated by **170** or **172**) for transmission from the client computer to the client interface **162**, in response to user input at the client computer. The codes provided to the client computer by the host computer may include computer-readable codes embedded in dynamic web pages and interpretable by a markup language interpreter. For example, SGML codes (such as HTML) interpretable by a web browser **326** may be transmitted to the client computer **104**. The computer-readable codes may alternatively, or in addition, include programs such as applets, scripts (e.g., JavaScript), objects, inclusions and/or links which are executable by the client computer to cause display of information thereat and/or to facilitate user interactivity.

In the embodiment described, the dynamic web pages produced by the server **102** produce the user interface seen at a client computer and may be operable to solicit user responses, for transmission back to the server **102**, via input elements such as text boxes, buttons, lists, drop-down list boxes, radio buttons, and hyperlinks, for example. A user may manipulate or select an input element thereby causing a data or selection signal associated with that input element to be transmitted back to the server **102.** In effect, the client interface **162** not only causes signals to be transmitted to client computers to cause various displays thereat, but it also receives signals from the client computers, based on user input thereat, and processes the received signals or forwards them to other software components at the server **102**, as appropriate, to implement the methods described herein.

Operation

Authentication Facility

Referring to Figure **2**, generally, it is desirable that a user undergo authentication by the server **102** (by "logging in") before he or she is allowed to access services provided by the server software. In cases where the server **102** and client computers **104**, **106** are connected by a Virtual Private Network (VPN) within the network **108**, the user may be required to undergo more than one level of authentication. For example, the user may first log in to the VPN, and then login to the system **100** to establish a communication session therewith. The authentication facility **164** facilitates this login.

Effectively, the authentication facility **164** is operable to direct the server **102** to identify a computer from which signals are received as being associated with a particular user, in response to receiving from that computer a user key associated with a user identifier identifying that particular user. The authentication facility **164** directs the server **102** to determine whether the user identified corresponds to an authorized user of the system before establishing a communication session with that user.

To establish a communication session, the referrer **116** may use the client computer **104** to request a login page from the server **102**, for example, by entering a network address of the server **102** into an address line of the web browser (**146**) on the client computer **104**. This causes the authentication facility **164** to cooperate with the web server (**124**) to send a login page to the client computer **104** for display in its web browser.

The referrer **116** then enters a login token and/or password associated with the referrer into the login page, and causes his/her client computer to transmit the login token and/or password back to the server **102**. The authentication facility **164** directs the server **102** to determine whether the login token and/or password received from a client computer corresponds to a user identifier

associated with an authorized user of the server **102**, and if so, the authentication facility **164** directs the server to associate the client computer with the authorized user, and enables the authorized user to proceed using the referral system **100** from that client computer. This constitutes a successful login.

In this embodiment, a physician may login under his or her own account, or alternatively, a physician or an MOA can login using a clinic account which may have multiple physicians associated therewith.

In response to a successful login, the client interface **162** automatically directs the server **102** to select and transmit an opening dynamic web page to the client computer. The opening dynamic web page is executed and displayed at the client computer **104** to which it was transmitted.

Opening Page

An exemplary opening dynamic web page is shown at **176** in Figure **3**. The exemplary opening dynamic web page includes a menu bar **178** and an executive summary **180**. The menu bar **178** includes buttons **182-208** that are associated with codes embedded in the dynamic web page that direct the client computer to initiate functionality at the client computer and/or at the server (**102**). The executive summary **180** is produced by code embedded in the dynamic web page, which is executed by the client computer when the page is received at the client computer. Referring to Figures **2** and **3**, this code directs the client computer **104** to produce a display template and cooperates with the client interface **162** to cause the filter **160** and database interface **158** to obtain information from the database **130** to populate the template with information from the database to produce the summary, as shown. Criteria used by the filter **160** are pre-established default criteria contained within the opening dynamic web page and associated with the executive summary **180**.

The menu bar **178** is treated as a unit. The web server (**124** in Figure **1**) may be configured with a plurality of dynamic web pages that include an instance of this menu bar and the functionality associated with it. In other words, the menu bar **178** need only be created once for the opening dynamic web page and can be replicated for each other dynamic web page on which it is desired to be used.

The menu bar **178** includes a make referral button **182** associated with code that causes the client computer and server (**102**) to cooperate to create an electronic referral. An incoming referral button **184** is associated with code that causes the client computer and server (**102**) to cooperate to cause a list of incoming electronic referrals for the user to be displayed. An "Outgoing Referrals" button **186** is associated with code that causes the client computer and server to cooperate to cause a list of outgoing electronic referrals made by the user to be displayed. An Incoming Messages button **188** is associated with code that causes the client computer and server to cooperate to cause incoming messages for a user to be listed. An Outgoing Messages button **190** is associated with code that causes the client computer and server computer to cooperate to cause outgoing messages for a user to be listed. An Administration button **192** is associated with code that causes the client computer and server to cooperate to permit a user (e.g., physician) or agent of the user (e.g., medical office assistant MOA) to update user information, update problem-related information associated with the current user, or update clinic accounts associated with the current user.

A Send Message button **196** is associated with code that causes the client computer and server to cooperate to facilitate a user of the system sending a message to another user. A Referral History/Archive button **198** is associated with code that causes the client computer and server to cooperate to display a history and summary log of every referral sent for a specific patient, or in some embodiments this button may also be associated with code that directs the server and client computer to cooperate to display a summary log of all

cancelled or completed referrals for a specific physician. A Wait List button **200** is associated with code that causes the client computer and server to cooperate to display a summary of all the active referrals put by a consulting physician on his or her waitlist. A Draft Referrals button **202** is associated with code that causes the client computer and server to cooperate to display a log of partly-completed referrals that may be stored until the referrer decides to complete the referrals.

A Message Trash button **204** is associated with code that causes the client computer and server to cooperate to display a list of deleted messages, possibly for a limited period of time, before they are permanently removed from the system. A Help button **206** is associated with code that causes the client computer and server to cooperate to display instructions to the user. A User Summary button **194** is associated with code that causes the client computer and server to cooperate to display the executive summary shown at **180** in Figure **3**. The Logout button **208** is associated with code that causes the client computer and server to cooperate to end the communications session with the server **102**.

Effectively, the code associated with the incoming referrals button **184**, the outgoing referrals button **186**, the incoming messages button **188**, the outgoing messages button **190**, the referral history/archive button **198** and the wait list button **200** respectively, cooperates with the client interface **162**, which cooperates with database interface **158** and the filter **160**, to cause the filter to filter the database records according to criteria associated with the particular function identified by the respective button, and causes a display associated with that function to be produced at the client computer.

If the user of the client computer actuates any of the buttons on the menu **178**, code associated with that button is executed at the client computer to initiate at the server **102** the process or functionality to which the button relates.

Creating a Referral

Actuation of the make referral button **182** of the main menu **178** invokes code in the current dynamic web page that causes a signal to be sent from the client computer to the client interface (**162**), and specifically to the referral creation facility (**166**), for a "new referral" dynamic web page, of a set of new referral pages, for receiving user input in connection with making a referral. The referral creation facility (**166**) cooperates with the web server (**124**) to produce and send to the client computer a first referral page.

An exemplary first referral page is shown at **210** in Figure **4**. This page facilitates patient selection through manual entry of patient information or through lookup in a patient database that may be maintained on the database **130**, to identify a patient with whom the referral is to be associated. In the latter case, the referral creation facility (**166**) may facilitate the user searching a referring physician's database, a clinic's database, or an independent database containing patient information, and transmitting any information found to the server **102**.

A referral menu bar **212** is included within the first referral page **210** and includes code that enables the user to link to a second page as shown at **215** in Figure **5**, which facilitates entry of further information regarding the patient, if not already provided through database lookup. This second page **215** includes a continue button **213** which further permits linking to a referring MD page as shown at **216** in Figure **6**.

Referring to Figure **6**, the referring MD page **216** may include entry boxes **218** - **224** with drop down menus that link to databases of names of doctors, types of referrals, reasons for referrals, and payers for services rendered in connection with referrals. In this embodiment, a logged-in physician can send referrals from himself or herself, and a medical office assistant (MOA) logged in under a clinic account can choose a physician from a list of physicians

associated with the clinic. The referring MD page **216** further includes a continue button **213** which facilitates linking to a consultant information page **226** as shown in Figure **7**.

Referring to Figure **7**, the consultant information page includes search entry boxes **228** and **230** that are linked to databases that facilitate searching for consulting MD's by name. In addition, this page includes an advanced search button **236** that facilitates searching by specialty, location, wait time, gender, language, problem/procedure, or any other parameter. Selection of a name in box **228** causes the server to produce a dynamic web page as shown at **232** in Figure **8** which provides a hyperlinked list of possible candidate MDs satisfying the entered criteria. The user may select one of the indicated candidates by clicking on the corresponding hyperlink, which causes the server to produce a consultant detail dynamic web page as shown at **234** in Figure **9**.

Referring to Figure **9**, the consultant detail **234** page lists details of the selected consultant. If the user is the actual consultant selected, the information shown may be edited. Otherwise, the consultant information may only be viewed.

Referring back to Figure **7**, actuation of the advanced search button **236** causes the server to produce an advanced search dynamic web page as shown at **238** in Figure **10**. The advanced search dynamic web page **238** includes a first drop down box **240** for selecting one of a plurality of consultant specialties and includes a second drop down box **242** for selecting one of a plurality of problems. The consultant specialties and problems are pre-stored in a sub-database of the database (**130)** to facilitate lookup as indicated. The advanced search page **238** also has an add button **244** that, when actuated, associates the problem indicated at **242** with the referral and links to a problem entry dynamic web page as shown in Figure **11**.

Referring to Figure **11**, the problem entry page **246** facilitates viewing of information relating to a problem, including a problem identifier **248**, recommended disposition **250**, information required for new referrals **252**, a list of information required **254** and patient instructions **256**. A box **258** is provided to enable the user to indicate whether the problem is urgent. Alternatively additional boxes or user input features may be provided to facilitate user entry of the level of urgency of the problem or to indicate "unsure" if the identity or nature of the problem is unclear (e.g., the referring physician is not fully confident in his or her preliminary diagnosis). In some embodiments, if the problem is not already selectable in the drop-down list boxes, the user may be allowed to enter the problem manually.

When problem information is entered by the user, the server may display problem-specific instructions directed to the referring physician and/or to the patient. The instructions may be based on predefined instructions provided by the system, or they may be custom instructions pre-entered by the consulting physician, as will be described below. For example, for a surgery case, a note may be displayed in box **254** for the referring physician, requesting that the latest kidney X-ray be provided to the consulting physician, and other notes may be displayed in box **256** to provide patient instructions such as not to eat for **24** hours prior to the appointment. (Patient-specific instructions may be conveyed to the patient by the referring physician or an MOA.)

Similarly, the referral creation facility (**166**) may cause the host processor to dynamically generate instructions for display in one of the boxes **250**, **252**, **254**, **256**, based on the selection of the problem, for example, or based on a series of diagnostic questions that may be presented in one of the boxes **250**, **252**, **254**, **256** or in an alternative user interface display, such as in a pop-up dialogue box, for example. Thus, for example, a referring physician (e.g., referrer **116**) may be notified that a patient ought to be sent urgently and directly to a hospital emergency room or be sent urgently to visit a consulting

physician (e.g., referee **118**) in his or her office. Similarly, the referring physician may be given instructions regarding what medical tests ought to be initiated for this patient to facilitate the acceptance or expeditious handling of the referral by the consulting physician. In this way, the consulting physician may communicate, at an early stage of the referral, the types of information that will need to be provided or gathered by the referrer for the benefit of the consulting physician. In other cases, the dynamically-generated instructions may simply inform the referrer (**116**) that the referee (**118**) will not accept this kind of referral, given the information received from the referrer (**116**) (e.g., the responses to the diagnostic questions). In this embodiment, the instructions generated by the server (**102**) may include instructions for the patient as well, which the referring physician (or an MOA) can convey to the patient.

Thus, the referral creation facility (**166**) may cause one or more questions, such as the above-mentioned diagnostic questions, to be presented to a user of the referrer computer (**104**), to receive a response to the question or questions from the user, and to cause the database interface (**158**) to store the response(s) in the database (**130**) in association with the collection of linked information units representing the present referral. For example, in the case of a medical referral, the referrer (**116**) may be queried regarding patient symptoms and/or what medical tests have been performed on the patient. The referral creation facility (**166**) may cause a notification to be transmitted to the referrer computer (**104**) if the response to the question does not satisfy a validation criterion. For example, if in response to the aforesaid query, the referrer (**116**) indicates that he or she has not initiated a particular medical test which is considered essential, a warning message may be annunciated to the referrer computer (**104**) to this effect. In some embodiments, the referral creation facility (**166**) may go further and decline to allow the collection to be stored in the database as representing a valid referral if this particular validity criterion is not met.

More particularly, the dynamic web page shown in Figure **11** may direct the server (**102**) to present a series of questions to the referring physician based on predefined questions stored in the database (**130**) relating to the condition/problem or procedure in question. The database (**130**) may be populated by a plurality of sets of default diagnostic questions associated with respective problems/procedures, which may have been designed in consultation with experts. The questions may form a diagnostic questionnaire, comprising, for example, a dozen commonly-asked questions by consulting physicians in respect of that problem or procedure. In some embodiments, the default questions may be customizable by a referring physician using the functionality described in connection with the Administration procedures described below. Responses by the referring physician may be stored in the database (**130**) for future access by others, such as the consulting physician. The responses may help the consulting physician to get at least some of the information necessary to properly address the problem presented by the patient.

Referring to Figure **11**, the referral menu **212** further includes a button **260** for entering notes and attaching files, which when actuated, causes the server to produce an dynamic web page as shown at **262** in Figure **12**. This page **262** includes a text box **264** for user entry of clinical notes and includes a file attachment facilitator **266** permitting a user to identify and attach files stored locally at the client computer. Files may include digitized representations of X-ray images, for example. After adding notes as shown in Figure **12**, the user may actuate a "done" button to indicate entry of information is completed and this may cause the server **102** to cause a page as shown in Figure **13** to be displayed at the client computer.

Referring to Figure **13**, the referral menu **212** further includes a summary button **269**, which when actuated, causes the server to produce a dynamic referral summary as shown at **270**. This summary includes a summary of information pertaining to the referral and includes a submit referral button **272**

which invokes code that causes a signal to be sent to the client interface (**162**) to cause it to store the referral in the database (**130**).

The effect of the referral information entry process provided by the above described dynamic web pages is to create a collection such as shown generally at **274** in Figure **14**, to validate the collection and then store it in the database.

Referring to Figure **14**, on actuation of the make referral button (**182**) of the main menu (**178**), the referral creation facility directs the server to set up a data structure for accumulating and temporarily storing, in scratchpad memory at the server, a collection **274** of information units representing information entered by the user through the referral entry pages described above. The collection **274** may be structured to include a referral record data structure **276**. Once a collection **274** of information units has been prepared, when the user actuates the submit referral button **272** shown in Figure **13**, the collection is validated against a list of rules, and if valid, is sent to the database interface (**158**) for storage in the database (**130**) as a valid referral collection **274**, which is implemented in part in this embodiment by the referral record **276**. Although, in this embodiment, the referral record **274** may contain most of the information units pertaining to a referral, it should be understood that the collection **274** may further include additional information units (for example, uploaded files) which are not stored in fields in the referral record **274**, but which are nonetheless linked so as to be part of the collection **274** of linked information units representing the referral.

In this embodiment the data structure of the referral record **276** includes the fields outlined in Table **1** below, for storing related information units associated with a referral.

Table 1. Fields of Referral Record (**276**)

Date **278** - date and time of when the referral was made. The contents of this field may be derived from the system date and time known by the client computer or the server computer **102**.

PatientID **280** - unique ID for patient (e.g., personal health number), The "PatientID" field **280** of the referral record **276** may include a pointer to a record in a patient table of the database **130** containing patient information.

Name **282** - formatted name of the patient,

Date of Birth (DOB) **284**- date of birth of the patient,

SentBy **286** - name of the sender (e.g., referring physician),

SentTo **288** - name of the receiver (e.g., consulting/referee physician),

ToID **290** - unique ID of person to whom referral was sent (e.g., billing number of consulting/referee physician),

FromID **292** - unique ID of person who sent the referral (e.g., billing number of referring physician),

ReferralType **294** - type of referral (In this embodiment: this field may hold an indicator identifying the referral as a referral, a re-referral of more than **6** months old, re-referral of less than **6** months old, a follow-up referral from in-patient care, a follow-up referral from specialist appointment, or other types of referrals),

ReferralID **296** - unique ID generated for the referral, this field associates the other fields of this collection to each other, and may be used as an index to find information units located in other database tables which are related to this referral,

ToStatusChanged **298** – holds change/update notifications for the referee (**118**). Such notifications may relate to any modifications made to the referral by a referring physician, for example. The referee may be notified as a result of changes of the contents of this field. In this embodiment, the ToStatusChanged field **298** is operable to represent combinations of the following modifications to the information units of the collection **274**:

(a) an appointment request to the referee (**118**), made by the referrer (**116**) using an information modification facility (**168**) of the server (**102**), the appointment request representing a request from the referrer (**116**) that the referee (**118**) set up an appointment for the client associated with the referral (**114**);

(b) an appointment change request to the referee (**118**), made by the referrer (**116**) using the information modification facility (**168**), the appointment change request representing a request from the referrer that an existing appointment for the client be rescheduled by the referee;

(c) an appointment cancellation request to the referee (**118**), made by the referrer (**116**) using the information modification facility (**168**), representing a request that the referee cancel the existing appointment;

(d) a waitlist request to the referee (**118**), made by the referrer (**116**) using the information modification facility (**168**), representing a

request that the referee (**118**) add the client to his or her waitlist for appointments;

(e) a waitlist priority change request to the referee (**118**), made by the referrer (**116**) using the information modification facility (**168**), representing a request that the waitlist priority of the client on the referee's waitlist be changed;

(f) a waitlist removal request to the referee (**118**), made by the referrer (**116**) using the information modification facility (**168**), representing a request that the client be removed from the referee's waitlist; and/or

(g) a "notes updated" status, indicating that the referrer (**116**) has updated (i.e., appended information to) the notes associated with the collection **274** and stored in a ReferralNotes field **302**, for the referee (**118**) to view; and/or

(h) a "referral cancelled" status, indicating that the referrer (**116**) has unilaterally cancelled the referral **114**.

FromStatusChanged **300** - holds change/update notifications for the referrer (**116**), such as any modifications made to the referral (**114**) by the referee (**118**), such as a consulting physician, for example. The referring physician may be notified of changes to the contents of the field. The FromStatusChanged field **300** in this embodiment is operable to represent combinations of the following modifications to information units of the collection **274**:

(a) an "appointment made" status, indicating that the referee (**118**) has set an appointment for the client associated with the referral (e.g., (**114**)) represented by the present collection **274**;

(b) an "appointment changed" status, indicating that the referee (**118**) has changed the client appointment associated with this referral (**114**);

(c) an "appointment cancelled" status, indicating that the referee (**118**) has cancelled an appointment for the client for this referral (**114**);

(d) an "added-to-waitlist" status, indicating that the referee (**118**) has added the client for this referral to the referee's waitlist;

(e) a "waitlist priority changed" status, indicating that the referee (**118**) has changed the waitlist priority associated with this referral (**114**);

(f) a "removed-from-waitlist" status, indicating that the referee (**118**) has removed this referral (**114**) from the referee's waitlist;

(g) a "notes updated" status, indicating that the referee (**118**) has updated (i.e., appended information to) the notes associated with the collection **274** representing this referral (**114**), the notes being stored in the ReferralNotes field **302**, for the referrer (**116**) to view; and/or

(h) a "referral cancelled" status, indicating that the referee (**118**) has unilaterally cancelled the referral (**114**).

In this embodiment, ToStatusChanged and FromStatusChanged fields **298**, **300** of the referral record **276** may separately or together be regarded as a modification flag.

To facilitate tracking modifications made to a collection **274**, the client interface **162** cooperates with the database interface **158** to associate a modification flag with the collection. Effectively, the modification flag may be used to identify collections which were modified by one party to a referral and/or to track the nature of the modification made, in order to provide a notification of the modification to the other party to the referral, for example. In this embodiment, collections modified by one party may be "marked" accordingly in the modification flag, at least until the other party has viewed the modification by invoking the information display facility (**167**). Thus, modifications caused by the referrer (**116**) may remain marked until viewed by the referee (**118**), and vice versa. However, it will be appreciated that it may not be essential for every modification made to a collection **274** to be marked in the modification flag; certain trivial modifications made to a collection by one party to a referral may simply not be worth bringing to the attention of the other party to the referral.

In this embodiment, the referral creation facility (**166**) initially sets the modification flag to a first value or status to indicate that the collection has not yet been modified. For a referral sent between two parties, the information modification facility (**168**) is further operable to set the modification flag to a second value or status, differing from the first value, when the information modification facility (**168**) is controlled, from one party's computer, to cause a modification to the collection **274**. The information display facility (**167**) is also operable to set the modification flag to a third value or status when the information display facility (**167**) is controlled, from the other party's computer, to select this newly modified (i.e., updated) collection **274** for viewing thereat. The third value may equal the first value if it is desired to reset the modification flag to its original state to indicate that a collection **274** has no modifications made to it by a modifying party which have not been viewed by a non-modifying party.

It will be appreciated that the modification flag may alternatively be implement by a single binary flag, implemented in a single field, for example. However, the modification flag may effectively comprise a plurality of modification sub-flags, operable to be set independently to respective pluralities of different values.

Continuing on with the description of the fields of the referral record data structure **276**, the data structure in this embodiment further includes the following fields.

ReferralNotes **302** – clinical notes associated with the referral. Both the referrer (**116**) and referee (**118**) can append notes to this field.

Urgency[i] **304** - urgency of condition i (boolean); in this embodiment, i=**1**...**3**;

Unsure[i] **306** - unsure of condition i (boolean) - certainty level associated with a preliminary diagnosis of the referrer; in this embodiment, i=**1**...**3**;

Problem **310** - Condition / Procedure **1**;

ProblemID[i] **312** - ID of a need or condition i associated with this referral, such as an identity of a disease sought to be treated in the patient; in this embodiment, i=**1**...**3**;

Status **314** – a referral status flag field comprising a referral status flag representing a status of the referral associated with this collection. In this embodiment, the referral creation facility (**166**) is operable to cooperate with the database interface (**158**) to store the referral status flag in the referral status flag field **314** of the collection **274**, and to set

the referral status flag to a first value to indicate that the collection has not yet been viewed by the referee (**118**) (i.e., it is "unread"). Other components of the server (**102**) may be operable to modify the referral status flag in response to signals received from the referrer or referee computers (**104**, **106**). In this embodiment, the following referral statuses are of interest and are represented by the referral status flag:

(a) unread: a status indicating that this collection has not yet been selected for viewing from a computer associated with the designated referee of the collection;

(b) pending: a status indicating that the referral represented by this collection has been selected for viewing from a computer associated with its designated referee, but no appointment has been set;

(c) appointment set: a status indicating that an appointment has been set for the referral represented by this collection;

(d) cancelled: a status indicating that the referral represented by this collection has been cancelled; and

(e) complete: a status indicating that the referral represented by this collection is complete.

Effectively, the referral creation facility (**166**) cooperates with the database interface (**158**) to initially store a referral status flag set to a first value to indicate that the collection has not yet been viewed by the referee (**118**). The information display facility (**167**) causes the referral status flag to change to a second value to replace the first value, if at least one information unit of the collection **274** is displayed at the referee computer (**106**) using the information display facility (**167**). For

example, the information display facility may cause the referral status flag field **314** of a collection viewed by the referee indicated in its referee field to be changed from an "unread" status to a "pending" status to reflect the fact that the collection **274** is no longer unread by the referee (**118**).

Whereas, in this embodiment, the contents of the referral status flag field **314** of each collection **274** can be set to one of a plurality of different statuses or values, it will be appreciated that in other embodiments, storage of these and other referral-related statuses or flags could be implemented in a variety of ways, such as in independently controllable status flags, possibly stored in separate information units, whether in the referral record **276** or elsewhere, for example.

Continuing on with the description of the field of the referral record data structure **276**, the data structure in this embodiment further includes the following fields:

Patient Contacted **316** - a boolean flag indicating whether or not the patient was contacted about the latest changes to this referral;

ContactedBy **318** – holds indications of whether the referrer (**116**) or referee (**118**) is responsible for contacting the patient;

WLpriority **320** - wait list priority (set by referee (**118**)); in this embodiment, four priority levels are used in association with waitlists;

WLstatus **322** - wait list status (boolean) (set by referee (**118**)) – a flag indicating whether or not the patient was put on the referee's waitlist;

ApptTime **324** - time of appointment with the referee for this referral;

MSPReason **326** - reason for referral (Medical Services Plan);

ApptCancelReason **328** - reason for cancelling an appointment;

Activity Log **330** – activity/event log for referral; the system adds an entry including an indication of any changes made to the referral and a chronological order indicator, such as a timestamp, every time there is a significant event pertaining to the collection, such as a flag, status, or certain kind of information unit change. Each significant event is an entry which becomes a part of a permanent referral history in the Activity Log **330**. The referrer (**116**) and referee (**118**) have restricted access to this field. They cannot edit or delete past entries in the field. This may be important for liability reasons.

In this embodiment, the activity log field **330** is automatically updated in response to at least the following events: referral sent, referral read, a referral cancellation request (by the referrer), a referral cancellation (by the referee), referral completion (by the referee), an appointment request (by the referrer), an appointment made (by the referee), an appointment change request (by the referrer), an appointment change (by the referee), an appointment cancellation request (by the referrer), an appointment cancellation (by the referee), a waitlist request (by the referrer), patient put on waitlist (by the referee), waitlist priority change request (by the referrer), waitlist priority changed (by the referee), waitlist removal requested (by the referrer), patient removed from waitlist (by the referee), clinical notes added (by the referrer or referee).

In some embodiments, codes may be provided in the input interface so that the referrer (**116**) or referee (**118**) may cause the server (**102**) to add specific entries to the activity log field **330** to record events which may affect liability, such as, for example, an indication that the referee

was "unable to contact the patient". In some embodiments, the activity log need not be implemented in the referral record **276** of the collection **274**, and could be stored in a separate file, for example. In this case, an index to the activity log may be provided in the activity log field **330** to link to the separate file.

WLReason **332** - reason for a wait list request;

CC[i] **334** - Carbon copy of referral was sent to (e.g., billing number of physician) [in this embodiment, i=**1**...**3**];

Payer **336** – Information about the payer who will pay for the referral (medical service plan, insurance company, workers' compensation board, etc.);

PayerOption **338** - extra info on payer (data entered in text box);

ReferralReason **340** - reason for referral (e.g., in this embodiment: see and treat, take over care, answer question, opinion only, second opinion, procedure, other); set by referrer.

AttachedFiles **342** - boolean variable indicating whether or not there are files associated with the referral; as seen in connection with Figure **12**, the client interface (**162**) is operable to cooperate with the database interface (**158**) to facilitate uploading a file, into the database (**130**), from a referrer client computer in response to upload signals received therefrom. Similarly, the client interface (**162**) facilitates downloading the file from the database (**130**) to the referee client computer in response to download signals received therefrom. The Attached Files flag field **342** includes an "Attached Files" flag, which indicates whether files associated with the referral (e.g., image files such as X-rays) are stored elsewhere in the database (**130**). Related files associated with

the collection **274** may be located by using the "Referral ID" field **296** of the referral record **276** to lookup their file names in an "Attached Files" table in the database (**130**), for example.

IsArchived **346** - boolean variable indicating whether the collection is active, archived, or about to be moved from the active list to the archive within a certain number of days (used to mark an almost-completed/almost-cancelled referral in the inbox/outbox);

Class Identifier **348** - In response to receiving information pertaining to a referral, the referral creation facility (**166**) may produce a class identifier classifying the referral into a predefined classification, and cause the database interface (**158**) to store the class identifier in the information field **348** shown in Figure **14**. For example, the server (**102**) may automatically produce a class identifier identifying an appropriate disposition of the referral in response to the information contained in the referral record, based on diagnostic rules stored in the database (**130**). The class identifier may be based wholly or partly on user responses to questions posed to the user by the client interface (**162**).

LocationID **350** – An identifier representing the location that the referral is going to. This is useful where the referee/consultant has multiple practices at multiple locations.

It will be appreciated that some of the fields in the referral record data structure **274** are updated or determined by processes executed by the server **102** in response to certain user actions and that the contents of some of the fields may be used to determine actions to be taken in a process or the outcome of a process.

In some embodiments, it may be desirable to store fewer, additional, or alternate information units to those shown in Figure **14**, as part of the collection **274**. Moreover, the information units of a collection **274** may be distributed across a plurality of files and database tables in partly or fully normalized form in order to improve performance and reduce storage requirements. It will be appreciated that there are many other equivalent ways of storing information pertaining to a referral within the scope of this invention.

Additional Database Tables and Data Structures

It will be appreciated that other database tables and data structures may be used. For example, the server (**102**) may create new instances of various records in the respective tables or delete existing record instances, as appropriate. The server (**102**) may also modify existing instances of records by modifying the fields of the records. Moreover, the appropriate columns (i.e., fields) of the various tables may be searched to filter or sort or otherwise format the information that is presented to a user. It may be necessary to link record instances from two or more tables in order to achieve a desired complex search which relies on data spread across the two or more tables. Some of the significant tables used in one embodiment are listed in Table **2**.

Table **2**. Significant Tables Used in One Embodiment

ArchiveTable	-holds all completed referrals
CustomDiagInstructionTable	-holds the custom instructions for each physician for each customized problem
DoctorTable	-holds information on physicians
MasterProblemTable	-complete list of all conditions and procedures
MDSeenProblemTable	-the list of problems which each consulting physician (e.g., specialist) will see

MessageTable	-holds all the current messages
MessageTrashTable	-holds all the messages marked for deletion
PatientTable	-holds patient info
ReferralFilesTable	-holds file location for any files associated with a referral or message
ReferralTable	-holds all active referrals
RelatedUserTable	-stores the list of physicians associated with a user such as a MOA. (There may be one entry in this table for each physician associated with an MOA.)
SpecialtyTable	-a list of all the specialties
UserTable	-stores info on the user
FeedbackTable	-stores feedback sent from a user to the system administrators, including comments, who sent them, and when they were sent

Referring to Table **2** above, the ArchiveTable and the ReferralTable may be used to store instances of the referral record **276** (see Table **1** and Figure **14**). The MessageTable and the MessageTrashTable may store instances of a message record similar to the referral record. The other record tables listed in Table **2** may include fields as indicated below.

Table **3**. CustomDiagInstructionTable

ProblemID – ID of the problem / procedure

billNum – unique billing number of the physician

RefMDInst – custom instructions to the referring physician

PatInst – custom instructions to the patient

Table 4. DoctorTable

LName - last name

FName - first name

MiddleInitial - middle initial

BillNum - unique ID for each physician (i.e., their billing number)

specialty[i] - physician's specialty (in this embodiment, i=**1**...**3**)

PHoneNum - phone number

faxnum - fax number

address - address

location - city

waitTime - physician's average wait time

HospPriv - hospital where physician has operating privileges

UserName - physician's user name

email - email address

cellnum - cell number

worknum**2** - alternate phone number

pager - pager number

language[i] - physician's *i*-th language (in this embodiment, i=**1**..**3**)

workExt[i] – *i*-th extension for phone number (e.g., i=**1**..**2**)

Table 5. MasterProblemTable

ProblemID - unique ID for problem

specialty - specialty that the problem belongs to

ICD**9** - the medical community's specified code for a problem

Problem - the problem name

RefMDInst - default referring physician instructions

PatInst - default patient instructions

NUWT - default non-urgent waiting time

TestResults - test results required

Table 6. MDSeenProblemTable

billnum - ID of physician that will see the problem

ProblemID - ID of problem seen by physician

ISCustom - flag indicating if custom instructions, questions or tests are present for this problem

Specialty - specialty that the problem belongs to

Table 7. PatientTable

LName - last name

FName - first name

MiddleInitial - middle initial

PatientAddress - address

PatientLocation - city

PatientPHN – personal health number

PatientID – unique patient ID

PatientChartNumber – patient chart number

PatientAge – patient age

PatientSex – patient sex/gender

PatientDoctor – patient family physician

PatientDOB – patient date of birth

PatientHomePhone – patient home phone number

PatientWorkPhone – patient work phone number

PatientCellPhone – patient cell phone number

PatientGuardian – patient parent or guardian

PatientGuardianRelationship – nature of relationship to guardian

PatientProblemHistory–historical information relating to patient problem

In some embodiments, there may be a separate patient table for each clinic/user that uses the system (**100**), such that each clinic/user is separately responsible for providing the contact information for a patient when a referral is made. This arrangement increases the privacy of patient information, and may prevent one clinic/user from overwriting the patient information entered by another clinic/user. Moreover, this arrangement is flexible in that it may

allow the patient to provide different information to different clinics/users (e.g., different summer and winter addresses).

Table 8. ReferralFilesTable

refID - ID of referral or message

File[i] - location of file *i* (in this embodiment, *i*=**1...5**)

Table 9. RelatedUserTable

UserID - unique ID of user

RelatedUser - unique ID of related user

Table 10. SpecialtyTable

Specialty – each entry in table is a medical specialty

Table 11. UserTable

LoginName - what a user uses to login with

UserID - the unique user ID

UserType - physician, MOA, clinic administrator

DisplayName - a text "real name" to display (e.g., if you login as KMC, it will display Kensington Medical Clinic)

Password - user's password

FailedLogin - stores # of failed logins (if it reaches a certain level, account will be frozen)

NewUser - stores whether the account has been used yet or not

LoggedIn - flag to ensure that each person can only login once at a time

The listings and descriptions of fields for the tables described above are not to be considered as limiting, since other fields consistent with the operation of this embodiment may also be used as appropriate. For example, the various tables may include columns having common keys operable to be used by the database software for cross-referencing data between tables. Furthermore,

many tables may have fields such as CreationDate, CreatedBy, ModifiedDate, and ModifiedBy to facilitate tracking changes to the data in those tables.

Other tables may also be used in some embodiments of the invention, as appropriate, such as a CustomDiagQuestions table for including a set of standard (but customizable by the consulting physician) diagnostic questions for a particular problem/need/procedure, or a CustomTestsRequired table for storing a set of standard (but customizable by the consulting physician) medical lab tests that the consulting physician requires be done before a patient is referred for an appointment. Moreover, joint database tables may be used to store a list of all the languages that a physician can speak or understand. For example, LanguageTable may store a list of languages and their associated language identifiers, and RelatedLanguageTable may store user identifiers in association with language identifiers. Similarly, since a physician may have multiple practice locations at various addresses, joint database tables (e.g., LocationTable and RelatedLocationTable) may be used to store a list of all the addresses at which the physician practices, by associating the respective physician's user identifier with the various addresses.

It will be appreciated that there are a variety of equivalent ways, within the scope of the present invention, to store information associated with a referral in a database. In alternate embodiments, some of the above-mentioned tables may be merged with other tables, and some fields may be moved to another table. Moreover, the number, types and sizes of the information units stored in the various tables may also vary between embodiments. This embodiment uses a local relational database ((**130**) in Figure **1**), however, various alternative database implementations could be used such as a distributed database, an object-oriented database, or a hybrid object-relational database, for example.

Draft Referral Storage

Making a referral may involve the bi-directional communication of data, including files, questions and responses, for example, between the referrer's client computer (**104**) and the server (**102**). In this embodiment, this exchange of data takes place over a number of discreet steps, leading to the possibility that an error may be made in one of the steps. If an error is made by the referrer (**116**) in the foregoing steps, the referrer may go through the preceding steps in reverse order to correct the error. Note also that, in this embodiment, the referrer (**116**) may optionally exit the make referral process at any stage by "saving" a partly completed referral without completing it.

A partly completed referral may be saved by actuating the submit referral button **272** shown in Figure **13**, which will initiate the validation procedure. The validation procedure will present the user with the option to save the referral as a draft referral or as a completed referral and if the user selects the draft referral option, a draft flag will be set in a status field (**314**) of the referral record data structure **276** so that searches of the records in the database **130** can distinguish between draft referrals and complete referrals. To retrieve draft referrals for later completion, actuation of the draft referrals button (**202** in Figure **3**) causes the host processor to search the database to obtain a list of draft referrals and to facilitate the user selecting a draft referral for editing, in which case the information already entered from the draft referral is copied into a blank data structure used for a new referral and the user can navigate through the make referral pages described above to add information, as appropriate.

Validation

If the user does not activate the save as draft function, a validation process is initiated to test the information entered by the user against one or more validation criteria. Validation criteria may include a default set of criteria established by administrators of the system, and/or custom criteria associated with the designated referee (**118**) for the referral (**114**), for example.

The validation process may involve checking whether all necessary information has been properly entered and whether the referral is a duplicate referral. A duplicate referral could arise if two different users accidentally tried to submit the same referral independently, or if the user forgot that the referral had been previously submitted. The existence of a duplicate referral is detected by configuring the filter (**160**) to identify whether there are any other collections in the database (**130**) having the same referrer and referee for the same patient and the same problem, possibly within a particular past time period (e.g., **6** months). If at least one such collection is identified, a warning notification may be provided to the user with an option to cancel or proceed with the referral, for example.

The validation process may also involve checking whether the referral is appropriate for the particular consulting physician designated as the referee. The appropriateness of a referral may be tested according to the specialty and/or the preferences associated with the consulting physician in the database (**130**). In this regard, each consulting/referee physician is associated with a list of conditions or problems that that consulting/referee physician will or will not treat, in order to limit unwelcome or inappropriate referrals. The client interface (**162**) facilitates allowing a referee to specify a list of specialities or practice areas for which it is appropriate to send referrals to this referee, thereby specifying conditions, problems, or needs that he or she will, and/or will not, address.

Waitlist Priority

In some embodiments, submitted referrals may automatically be prioritized onto a waitlist of the referee (**118**) in accordance with predefined problem prioritization rules, which may be stored in the database (**130**) of the server (**102**). Automatic prioritization of incoming referrals in this way enables the referee (**118**) to filter or sort incoming referrals by waitlist priority by configuring the filter (**160**) to select or sort collections **274** by the contents of

their WaitlistPriority field **320**, for example. Sorting referrals in this way may be particularly useful for consulting physicians who need to manage their waitlist so as to address more serious medical problems sooner. The predefined problem prioritization rules used to classify incoming referrals may associate a particular waitlist priority with a particular problem or procedure indicated in the information submitted by the referrer (**116**). Prioritizing a referral may thus include reading a collection **274** for information units representing a problem or procedure in respect of which the referral was submitted (e.g., reading the ProblemID field **312** of referral record **276**), searching the database **130** to determine a priority associated with that problem or procedure according to relevant prioritization rules stored in the database, and associating a particular priority status with the referral according to the relevant prioritization rule, by storing a priority status value in the Waitlist Priority field **320**. One of four waitlist priorities such as "emergent", "urgent", "expedient", and "routine" may be used, for example. The server (**102**), upon receiving a referral submission, may automatically classify a corresponding collection as having one of these four priorities, which effectively places the referral into a waitlist queue associated with that priority. In this embodiment, the consulting physician may rely on the default problem priority rules provided by the database **130** or may customize them to suit the consulting physician's preferences.

In this embodiment, third parties (e.g., insurers) pay the cost of a referral, whereas physicians decide if it is medically necessary. Thus, when a referral is submitted by the referee (**116**), the host processor may send a notification to a payer indicated by the Payer field **336** to facilitate pre-approval of payment to the referee (**118**). Alternatively, upon receiving a notification from the referee (**118**) that the referral is complete, the host processor may facilitate the referrer (**116**) notifying the payer that the referee (**118**) should be paid.

After the referral has been validated, the server **102** is directed to send or store all the information units pertaining to the referral, to or at the database **130**. These information units are linked as a collection **274** representing the referral. The preparation of an electronic referral is thus completed.

Once a plurality of referrals have been made and stored as collections of information units as described above, various actions may be taken to treat the referrals (more precisely, the corresponding collections) as groups for display purposes. Actions may be taken to facilitate viewing and modifying of the referrals, and more particularly, the information units associated with the collections used to represent them, in response to user input. In this regard, the filter **160** shown in Figure **2** facilitates grouping for display purposes.

Filter

As mentioned above, each client computer **104** or **106** in Figure **2**, is operatively coupled through a respective client interface **162** to a respective filter **160** at the server **102**. In response to signals received at the client interface **162** from a client computer, the filter **160** is operable to cause the database interface **158** to identify collections of information units in the database **130** that satisfy a criterion, for example, by performing a search of the database for such collections, or by referencing a file, pointer or data stream indicating the identity of such collections. The filter **160** is further operable to cooperate with the client interface **162** to cause identifications to be displayed to a user at the client computer such that respective identifications correspond to respective collections of information units identified by the filter as satisfying the criterion. Displayed identifications, in effect, identify the group of collections satisfying the criterion, to the user.

In this embodiment, causing identifications to be displayed may involve causing labels corresponding to collections satisfying the criterion, to be displayed at the client computer. A label may comprise representations of one or more particular information units from the corresponding collection,

displayed using a first set of display parameters. For example, as illustrated in Figure **15**, the client computer could be caused to display a label **352** comprised of particular information units from each corresponding collection of the group of collections identified by the filter **160**. Each respective label may be shown as a respective line including a respective referral submission date, client name, a client identifier (e.g., personal health number), a client date of birth, a problem/need, an urgency status of the problem/need, a referral or waitlist status, a referrer name, and the referee name, and an indication of whether the client has been contacted or not, for example.

Referring back to Figure **2**, the filter **160** is further operable to use, as its filter criterion, a compound criterion comprising a plurality of sub-criteria, for example, a first criterion and one or more additional criteria. For example, a user could opt to view only identifications of incoming referrals from a desired referrer. To accomplish this, the client computer may be configured to receive user input indicating a desire to seek incoming referrals from the desired referrer and pass such input to the filter **160** to cause it to select from the database collections, having a ToID field **290** identifying the user (i.e., a first sub-criterion), and a FromID field **292** identifying the desired referrer (i.e., a second subcriterion). A set of identifications corresponding to the selected collections could then be caused to be displayed at the client computer in a manner analogous to that illustrated in Figure **14**.

It will be appreciated that the user interface provided by the client interface **162** may use mnemonic input elements to facilitate the user controlling the filter **160**. In the above case, for example, the client interface **162** may allow the user to select the desired referrer's name from a list, and then it may map the selected name to a corresponding referrer identifier to be used to search the FromID field **292**. Thus, while it may be impractical for the user to remember the desired referrer's identifier, the user can readily use a mnemonic input element associated with the referrer's identifier, to effectively select the desired referrer identifier.

Moreover, the client interface **162** may be operable to use a plurality of display criteria when causing identifications to be displayed, and these display criteria may correspond to respective sub-criteria of a collection identification criterion used by the filter **160**. For example, the client interface **162** may cooperate with the filter **160** to cause labels associated with collections satisfying an additional selection criterion to be displayed at the client computer using a second set of display parameters, in order to distinguish labels associated with collections which satisfy the additional selection criterion from labels associated with collections that do not. The second set of display parameters may cause rendering of identifications satisfying the additional selection criteria in a different font, size or colour from surrounding identifications, displaying them in association with a graphic or animation, or the use of other distinguishing indicia. For example, in this embodiment, a new or modified but unread collection may have a blue blinking dot displayed adjacent a line of text identifying the unread collection. To take another example, an identification may be rendered in a bold font, thus distinguishing it from the other identifications which are rendered in a normal font.

The client interface **162** may automatically cause the filter **160** to use a predefined criterion as its criterion for searching, or it may solicit a user at a client computer to supply the criterion to be used by the filter. The client interface **162** may also be operable to present a set of predefined criteria at the client computer to the user, and to solicit the user to select a predefined criterion from among the presented set. In this embodiment, this is accomplished by the client interface **162** providing to a user at a client computer, a set of selectable input elements such as hyperlinks or buttons corresponding respectively to the set of predefined criteria. When the user selects one of the aforesaid input elements, this causes a selection signal, indicating a selected predefined criterion corresponding to the selected input element, to be transmitted to the client interface **162**, which, in turn, causes the filter **160** to use the selected predefined criterion as its search criterion.

Thus, the client interface **162** may be operable to cause the filter **160** to use, as its criterion, a predefined criterion selected from a set of predefined criteria, in response to a selection signal received from the client computer, indicating the predefined criterion.

Referring to Figure **3**, some exemplary predefined criteria and input elements of this embodiment are explained in connection with the executive summary **180**. The opening page shown in Figure **3**, may have embedded within it, code that automatically communicates with the filter **160** to cause it to scan the database **130** for new referrals for the current user, new messages, etc. The filter performs these scans and returns a number such as shown at **354** indicating the number of records meeting the criteria. The executive summary **180** includes a set of buttons beside the numbers returned by the filter (**160**), which invoke corresponding code to signal to the server (**102**) to cause it to actuate the filter to retrieve a list of referrals corresponding to the labels. For example, there is provided a "New Referrals" button **356** for causing the filter (**160**) to identify unread collections (i.e., new incoming referrals) addressed to the user. There is also a "Patients to be Contacted" button **358** for causing the filter (**160**) to identify collections for which the user is acting either as a referrer or as a referee and for which the patient has not yet been notified of the latest changes to the referral status. There is also a "Today's Appointments" button **360** operable to cause the filter (**160**) to identify collections for which the user is designated as referee of the referral and which have appointments set for today, a "Patient with Appointments" button **362**, a "Patients on Waitlist" button **364**; an "Updated Referrals - Incoming" button **366** and an "Updated Referrals - Outgoing" button **313**.

In addition, it will be appreciated that buttons **184**, **186**, **188**, **190**, **198**, **200**, **202** and **204** of the main menu **178** are similarly associated with respective predefined criteria for use by the filter (**160**) to identify and display a set of collections to the user.

Referring to Figure **2**, it will be appreciated that at least some of the predefined criteria provided to the filter **160** in response to actuation of any button may be automatically established based on the identity of the user associated with a client computer, as identified by the authentication facility **164** when a session is established. That is, a user identifier identifying the user (e.g., a referrer identifier identifying the referrer **116**, or a referee identifier identifying the referee **118**) may be used to derive a simple or compound predefined criterion (or predefined criteria) for use by the filter **160**. The predefined criteria includes criteria which are considered likely to be useful to this user, such as criteria identifying various types of collections associated with the user. Thus, the predefined criteria provided for selection to the referrer **116** or referee **118** may cause the filter **160** to identify collections having either the referrer identifier or the referee identifier in either the "FromID" field **292** or the "ToID" field **290**, for example.

The filter **160** is further operable to cause identifications to be displayed at the client computer in an order dependent upon an information unit in each collection corresponding to a displayed identification. For example, the filter **160** may be configured to cause display of a given set of identifications in chronological order or reverse chronological order. The sort key used by the filter **160** may be controllable by the user of the client computer, such as by selecting a desired sort key from several options in a drop-down list box, e.g., **372** in Figure **15**.

The filter **160** may be operable to test various information units of respective collections as part of its criterion. In this embodiment, the filter **160** is further operable to establish its criterion based on the state or value of the referral status flag field **314** in the collection **274** shown in Figure **14**. Thus, the criterion used by the filter **160** may include a condition that the referral status flag (**314**) of a collection satisfies a referral status criterion, in which case the filter will identify collections having a referral status flag satisfying the referral status criterion. For example, the referral status criterion may be that a

collection has a referral status flag (**314**) indicating that the collection has not yet been selected for viewing from the referee computer **106** (i.e., having an "unread" status).

Referring to Figures **2** and **14**, testing a flag may be part of a compound criterion. For example, the referrer **116** may wish to identify collections sent by the referrer to the referee **118** that the referee has not yet viewed by selecting them from the referee computer **106**. This may be accomplished in this embodiment by the referee **118** controlling the client interface **162**, from the referee computer **106**, to cause the filter **160** to identify collections having a "FromID" field **292** matching the referrer identifier, a "ToID" field **290** matching the referee identifier, and also having a referral status flag indicating that a collection is unread.

In this embodiment the filter **160** may also be operable to establish its criterion based on the state or value of the modification flag as represented by the ToStatusChanged and FromStatusChanged fields **298**, **300** in Figure **14**. Thus, the filter **160** may be operable to identify collections having a modification flag satisfying a modification criterion so that identifications corresponding to collections having information units that have been modified in accordance with the modification criterion, are caused to be displayed at a client computer. For example, the filter criterion may be that a collection has a modification flag indicating that the referral associated with that collection has been cancelled. A modification flag may also be used as part of a compound criterion. For example, the referee **118** may wish to identify collections sent from the referrer **116** to the referee that the referee has cancelled. This may be accomplished in this embodiment by the referee **118** controlling the client interface **162**, from the referee computer **106**, to cause the filter **160** to identify collections having a "FromID" field **292** matching the referrer identifier, a "ToID" field **290** matching the referee identifier, and also having a FromStatusChanged field **300** indicating that the referral has been cancelled by the referee **118**.

Thus, it will be appreciated that the referrer **116** and referee **118** may set the filter **160**, from their respective client computers, to various settings throughout a session, to manage referrals in this system.

Information Display and Modification Facilities

Referring to Figure **2**, as stated earlier, the client interface **162** includes an information display facility **167** and an information modification facility **168** for remote viewing and modifying of collections. Both facilities **167**, **168** are operable to be remotely controlled in response to control signals received from a client computer such as **104** or **106**. In response to the control signals, the information display facility **167** is operable to facilitate viewing, from the client computer, of at least one information unit in a collection identified by the filter **160** and selected from the client computer by user input thereat. Similarly, in response to the control signals produced by a client computer, the information modification facility **168** is operable to facilitate causing a modification, from the client computer, of at least one information unit in a collection identified by the filter **160** and selected from the client computer by user input thereat.

As described above, the filter **160** is used to identify a set of collections in the database **130** meeting filter criteria established by default in response to user actions and/or by direct input of criteria by the user. In response, a set of identifications respectively corresponding to the set of collections is displayed at the user's client computer. A user may select a particular collection from the set for viewing. In particular, the client interface **162** is operable to receive, from the client computer, a selection signal indicating selection by the user of a particular collection from among the set of collections identified by the filter **160**. In this embodiment, the selection signal may be generated when the user clicks on a hyperlink embedded in a displayed identification, thereby effectively selecting the collection that it represents. The information

display facility **167** causes display at the client computer of information units from the selected collection, in response to the selection signal.

Referring to Figures **2** and **14**, the collection **274** described above as having been created by the referrer **116** from the referrer computer **104**, and being addressed to the referee **118** at the referee computer **106**, may be identified by the filter **160** and selected by a user operating either the referrer or referee computers **104**, **106**. In response to selection signals from either the referrer or referee computer **104**, **106** the client interface **162** causes the information display facility **167** to cause at least one information unit in this collection **274** to be displayed at the particular computer or computers **104**, **106** from which the selection signal was received. Similarly, information units of this collection **274** may be remotely modified from either computer **104**, **106** using the information modification facility **168**. Once the information display facility **167** causes display of information units from a selected collection **274** to a user at a client computer in response to a selection signal identifying the selected collection, the information display facility **167** then presents a set of modification options, relating to the collection, to the user, the modification options being selectable and controllable through corresponding input elements (e.g., hyperlinks, buttons, text input boxes, and other suitable input elements). If the user selects one of these modification options, this is interpreted by the information modification facility **168** as the issuance of a modification command. The information modification facility **168** thus facilitates the user modifying at least some information units of the collection **274** in accordance with the modification command issued. In response to issuing a modification command, the information modification facility **168** may prompt the user for user input providing the details of the desired modification. For example, if the user issues a command to modify the notes associated with the referral **114**, the user may be prompted to enter additional notes, which are appended to the Referral Notes field **302** of the corresponding collection **274** as the command is executed. Modifications may relate to

modifying the data content of the collection **274** or flags associated with the collection, for example.

Effectively, this collection **274** is accessible in this embodiment through both the referrer and referee computers **104**, **106** for both viewing and modifying, since both the referrer **116** and referee **118** are parties to the referral **114**. The ability to both view and modify a collection representing a referral **114**, from respective computers associated with the referrer **116** and the referee **118**, provides a flexible vehicle for ongoing, interactive communication between the referrer **116** and referee **118** of information pertaining to the referral **114**.

Incoming Referrals / Outgoing Referrals

Referring back to Figure **3**, in this embodiment, the system **100** facilitates management of referrals by providing a virtual inbox and outbox for incoming and outgoing referrals, respectively. Specifically, "Incoming Referrals" and "Outgoing Referrals" buttons **184** and **186** are operable to send signals to the server **102** to invoke blocks of program codes that cause the server **102** to cause representations of incoming or outgoing referrals (as appropriate) to be displayed at the client computer (e.g., in the web browser **142**).

Referring to Figures **3** and **14**, on receiving a signal from the client computer in response to actuation of the incoming referral button **184**, for example, the filter (**160**) is loaded with filter criteria specifying that all collections having the current user identifier in the ToID field **290** are to be located and sorted according to the contents of the urgency field **304**. The filter (**160**) returns to the display facility (**167**) a list of records satisfying the above criteria and sorted as specified. The display facility (**167**) provides at the client computer a selectable list of identifications corresponding to incoming referrals, as shown at **500** at Figure **15**. The display interface hyperlinks the identifications to actual records of corresponding collections in the database (**130**) so that

the user can simply click on an identification of interest to see details of the associated referral.

The page shown in Figure **15** includes input elements **370**, **372** and **374** which may be used to receive user input to cause the filter (**160**) and client interface (**162**) to change the list of identifications seen in Figure **15** according to user-specified criteria. In this embodiment, the user may control the filter (**160**) to view only identifications corresponding to referrals meeting a predefined criterion, such as only new referrals, unread referrals, referrals where the patient has been contacted, updated referrals, referrals to a particular physician, patients on the wait list, patients with appointments, or only pending referrals, for example. Drop down boxes in input elements **370** and **372** can be used to give the user the ability to filter and sort database records based on criteria associated with any suitable field in the referral record data structure **276** shown in Figure **14**.

When the user actuates a hyperlink associated with one of the labels seen in the list of identifications displayed in Figure **15**, a signal is sent to the server (**102**) causing it to produce and send to the client computer a dynamic web page to produce a display as shown at **376** in Figure **16** at the client computer, to reveal the contents of a selected referral record. This display is caused by the information display facility **167** of the server **102**.

Referring to Figure **16**, a display produced by an dynamic web page for displaying the contents of a user-selected referral collection is shown generally at **376**. The display includes a referral menu bar, shown generally at **378**, and an information area, shown generally at **380**. In the embodiment shown, the information area includes information from the user-selected collection, shown as bold text. This text is obtained from corresponding fields in the collection **274** shown in Figure **14**, for example. The information shown in this embodiment includes the patient name **382**, the referring physician name **384**, the consulting/referee physician name **386**, the problem or need

388, the referral status **390**, an indication of whether the patient was contacted regarding the latest change to the status of their referral **392**, an indication of to whom a carbon copy of the referral was sent **394**, the reason for the referral, the payer for the referral **398**, the referral type **400**, clinical notes **402**, and an event log **404**.

In the specific collection shown in Figure **16**, the referring physician is "Gregory Baldwin", as shown at **384**, the referee **118,** or consulting physician, is "Damian Burianyk", as shown at **386**, and the patient is "Robert MacKenzie", as shown at **382**. Since this view was generated in response to selecting a hyperlink **352** in an "Incoming Referrals" display (Figure **15**), it should be evident that the display of Figure **16** would have been presented at a computer associated with the referee "Damian Burianyk" or by an authorized agent of this referee (e.g., an associated MOA).

An "Event Log" display area **404** shows only three entries in reverse chronological order:

(a) a first entry for Jan. **27**, **2004**, when the referral was first created by the referrer **116** by using the referral creation facility **166**;

(b) a second entry for Feb. **04**, **2004**, when the referral was first read by the referee **118** via the information display facility **167**; and

(c) a third entry for Feb. **16**, **2004**, when the referee **118** set an appointment using the information modification facility **168**.

The information area **380** further includes its own menu area, shown generally at **408**, including the following buttons: show patient info **410**, show referring MD info **412**, show consultant MD info **414**, show problem/procedure details **416**, show clinical notes **418**, show activity log **420**, and add to activity log

421. The show patient info button **410** invokes code within the dynamic web page that causes the server **102** to send to the client computer a new dynamic web page similar to that shown in Figure **16**, with further information pertaining to the patient from the collection **274**, or from another patient database that may be accessible to the system. The "show referring MD" button **412** invokes code within the dynamic web page that sends signals to the server **102** that cause it to send to the client computer a new dynamic web page (not shown) similar to that shown in Figure **5**, with further information pertaining to the MD from the collection **274**, or from another MD database that may be accessible to the system. The show consultant MDinfo button **414** may do the same to cause a display of information similar to that shown in Figure **9** pertaining to the consultant MD. The show problem/procedure details button **416** invokes code within the dynamic web page that causes the server (**102**) to send to the client computer a new dynamic web page, similar to that shown in Figure **11**, with further information pertaining to the medical problem from a medical problem database that may be accessible to the system.

At least some clinical notes from the notes field (**302**) are displayed to the user in a notes display area, as shown generally at **402**. While this display area may be made larger than illustrated in Figure **16**, it may be desirable to display more information from the notes field (**302**) than can be conveniently displayed in this display area. Accordingly, the show clinical notes button **418** invokes code within the dynamic web page that causes a window to open and which causes the server (**102**) to send to the client computer a dynamic web page similar to that shown in Figure **12** to enable access to any further information stored in the notes field (**302**) or files associated therewith.

At least some entries stored in the activity log field (**330**) are displayed to the user in the event log display area shown generally at **404**. The show activity log button **420** invokes code within the dynamic web page that causes a

window to open in the current page to display any further information stored in the activity log field (**330**) of the record (**276**).

The add to activity log button **421** invokes code within the dynamic web page that enables a user to add a free-form text entry to the activity log field (**330**). The user may enter a note, for example, indicating that attempts have been made to contact the patient but that to date, no contact has been made. A chronological order indicator (e.g., date and time) and an identification of the user may automatically be associated with the entry in order to indicate who made which entry, and when.

Still referring to Figure **16**, operations of the referral menu bar **378** will now be described.

The referral menu bar **378** includes a plurality of buttons that invoke code in the current dynamic web page, to cause corresponding processes to occur at the server (**102**). In the embodiment shown, the referral menu bar **378** includes a cancel referral button **422**, a reply button **424**, a manage files button **426**, a return to source page button **428**, a put on wait list button **430**, a medical services plan (MSP) referral request button **432**, a complete button **434**, a view referral history button **436**, a change appointment button **438**, a cancel appointment button **440** and an add notes button **442**.

Actuation of the cancel referral **422** button invokes code that causes the client computer to send the server (**102**) a cancellation signal to indicate that the referral should be cancelled. When either party to the referral cancels a referral, the contents of the status field (**314**) of the corresponding referral collection (**274**) are replaced with a cancelled status indicator, and the client interface (**162**) may automatically generate a cancellation message to the other party, similar to that shown in Figure **18**, indicating that the referral was cancelled and why.

In response to actuation of the reply button **424,** a signal is sent from the client computer to the server (**102**) causing the server to produce and send to the client computer an dynamic web page for sending a message to the other party to the referral, such as is shown at **368** in Figure **18**.

Referring back to Figure **16**, in response to actuation of the manage files button **426**, code is invoked at the client computer to send a signal to the server (**102**) to cause it to cause a window to open at the client computer and to list within that window the names of any files indicated in the attached files field (**342**) of the collection (**274**). The names of the files may be hyperlinked to the actual files enabling the user to simply click on one of the listed files for viewing.

In response to actuation of the view referral history button **436**, code is invoked to cause the client computer to send a signal to the server (**102**) requesting a referral history/archive dynamic web page displaying a list of all referrals made for the patient indicated in the display area **380**. The list may be shown in a format similar to that shown in Figure **15**, for example. To obtain the information required to populate this list, the filter (**160**) may be configured to identify collections for which the contents of the PatientID field (**280**) match the current patient's identifier (e.g., PHN) and for which the contents of the status field (**314**) indicate that the referral has been completed.

When a referral is completed, the user may actuate the MSP referral request button **432** to indicate that payment is now authorized to be made in connection with this referral by a third party payer identified by the payer field (**336**). The payer may be a health insurer, for example. The server (**102**) may be configured to automatically submit a payment request to the indicated payer in response to actuation of the MSP referral request button **432**.

Actuation of either the change appointment button **438** or the cancel appointment button **440** invokes code at the client computer that sends a

signal to the server (**102**) causing it to locate the contents of the appointment time field (**324**) to determine if and when an appointment has been scheduled with the consulting MD indicated in the ToID field **290** of the collection. If no appointment time has been previously entered into the appointment time field (**324**), a dynamic web page (not shown) containing a blank template for doing so is presented at the client computer. If an appointment time has been previously entered into the appointment time field (**324**), a template is provided to facilitate changes to the appointment time. The template may provide a list of times with certain time blocked out, to indicate that appointments have already been booked in those times, to permit persons scheduling appointment times to avoid selecting a contentious appointment time.

Of course, to maximize the benefit of making appointments with this system, it may be desirable that the system include provisions for managing all appointments, not just those that relate to referrals. In this regard a suitable interface between Microsoft Outlook™, for example, and the appointment time fields of collections may be desirable.

Actuation of the "put on waitlist" button **430** by a consulting physician invokes code at the client computer that directs the client computer to send signals to the server (**102**) to cause the referral to be entered into a virtual waitlist associated with the consulting physician. The waitlist may be implemented as a file containing identifications of referral records having a "sent to id" field (**288**) identifying the physician with whom the waitlist is associated, and the collections associated with this file may be automatically sorted according to the contents of the waitlist status, priority and reason fields **320**, **322** and **332**, for example.

Actuation of the complete button **434** invokes code at the client computer that causes a signal to be sent to the server (**102**) to cause it to change the referral status field (**314**) of the present collection (**274**) to "complete" so that it

may be treated differently than pending referrals by the filter (**160**). This button may appear on an dynamic web page intended for viewing by a consulting physician and desirably would not be made to appear on an dynamic web page intended for viewing by a referring physician.

Actuation of the add notes button **442** invokes codes for causing the client computer to send a signal to the server (**102**) to cause it to open a window in the currently displayed dynamic web page to facilitate the entry of notes which are then appended to the Notes field (**302**) associated with the collection (**274**).

Referral History / Archive

Referring back to Figure **15**, activation of the Referral History/Archive button **198** of the main menu **178** invokes blocks of codes at the client computer causing it to send a signal to the server (**102**) causing it to send back to the client computer a dynamic web page similar to that shown in Figure **15**. To do this, the filter (**160**) is loaded with filter criteria that employ the contents of the status field (**314**) to cause selectable identifications of archived (i.e., complete) referrals to be displayed. The user may then be presented with a plurality of options to narrow the filter criteria and sort the identifications using the user entry boxes **370** and **372** for example. In some embodiments, the dynamic web page may accept further user input specifying a specific patient in order to configure the filter (**160**) to identify referrals sent for that patient by employing the contents of the patient identifier field **280**. Alternatively, or in addition, the dynamic web page may be operable to accept user input specifying a specific physician, in order to configure the filter (**160**) to identify cancelled or completed referrals for that physician. In the latter case, the filter (**160**) would be configured to identify collections based on the contents of the ToID, FromID and status fields (**290**, **292** and **314**) as appropriate.

Various filter (**160**) criteria could also be used in combination based on any combination of appropriate information units of respective collections (**274**) in

the database **130**. For example, a user might control the filter (**160**) to cause the server (**102**) to show "Archived Referrals" for a specific patient or physician, with a date before January **1**, **1990**.

Wait List

Referring back to Figures **3** and **15,** when the user actuates the wait list button **200**, blocks of code are executed by the client computer to cause a signal to be issued to the server (**102**) to cause the server to specify filter criteria to the filter (**160**) to cause it to seek records from the database (**130**) according to the contents of their waitlist priority field (**320**), wait list status field (**322**) and reason field (**332**). Records satisfying the specified criteria are identified and the client interface (**162**) causes a dynamic web page as shown in Figure **17** to be sent to the client computer to list identification of referrals on a waitlist associated with the user. Each referral identification is hyperlinked to its corresponding referral collection (**274**).

In the embodiment shown, the identifications include patient name **444**, date for which the referral was created **446**, date of birth **448**, an urgency field **450**, a problem procedure field **452**, a sent by field **454** a sent to field **456**, a priority field **458**, a length field **459** and a type field **462**. Each of the fields, with the exception of the length field **459**, are loaded with the contents of corresponding fields by the same names in the corresponding referral record (**276**). The contents of the length field **459** are derived from the identification indicated by the problem procedure field **452** or may be derived from appointment information.

The waitlist dynamic web page may include further buttons **460** and **461** and associated blocks of code that respectively direct the server (**102**) to remove a referral from the waitlist or change the priority of a referral on the waitlist. Execution of these blocks of code causes the server **102** to correspondingly modify the Waitlist Priority **320**, Waitlist Status **322** and Waitlist Reason **332**

fields, as well as the ToStatusChanged **298** and FromStatusChanged **300** fields of the collection (**274**) associated with the referral.

Message

Referring back to Figure **2**, as a further feature of the system, the client interface **162** may facilitate a user sending a message, for example, in association with making particular modifications to a collection **274**. That is, in response to receiving particular modification commands from one of the referrer and referee computers **104**, **106**, the client interface **162** may facilitate the user sending a message from that computer to the other of said referrer and referee computers **106**, **104**. In this embodiment, for instance, when either the referrer **116** or referee **118** cancels a referral, he or she is prompted to enter information for a cancellation message (e.g., explaining the reason for the cancellation), and this message is sent to the other party. In addition, in this embodiment, when marking a collection **274** associated with a referral as having been completed, the referee **118** is prompted to enter information for a "referral complete" message, and this message is sent to the referee **118** as a consultation letter reporting the results of the referral.

Incoming Messages / Outgoing Messages

Referring back to Figure **15,** the incoming messages/ outgoing messages buttons **188** and **190** invoke code that provides integrated messaging to facilitate referral management. When a user actuates the buttons entitled "Incoming Messages" **188** or "Outgoing Messages" **190**, this causes the server **102** to display representations of incoming or outgoing messages at the user's computer, in a list form, similar to the way in which conventional emails would be seen in an Inbox or Sent folder (i.e., outbox) in Microsoft Outlook ™, for example. To generate a message, a message generation dynamic web page as shown in Figure **18** may be sent to the client computer in response to completion or cancellation of a referral or in response to user activation of the send message button **196** on the main menu **178**.

Referring to Figure **18**, the dynamic web page for creating a message may include the main menu **178** seen in Figure **15** and further includes an input area shown generally at **462**. The input area **462** includes a select recipient button **464** which provides a contact list of all doctors registered with the system. Provisions may be provided to facilitate entry into a particular point on the contact list simply by entering the first few letters of the desired recipient's last name, for example, and then conventional scrolling may be used to locate the desired doctor's name. Clicking on the desired doctor's name causes the name to be copied to a "to" field **466** of the input area **462**. Similar provisions may be provided for identifying the person from whom the message is to be sent, with the additional provision that the user identifier of the person logged onto the system may be used to locate the name of the person in the database **130**, and this name may be used as a default name in a "from" field **468** in the input area **462**.

Provisions such as a drop down box **470** may be provided for identifying message types. Messages in this embodiment are generally one of six types:

General Message Type: a general message, not associated with a patient, between physicians (i.e., referrers and/or referees);

Patient-related Message: a message between physicians about a patient;

Cancellation Message: a message generated when either party cancels an electronic referral, indicating that the corresponding real-life referral was cancelled and why;

Referral Complete Message: a message indicating that the referral is complete and including a consultation letter having a written account of the referee's diagnosis, treatment, and recommendations, for example, as well as other results of the referral;

Missed Appointment Message: a message indicating that the patient has missed an appointment with the referee; and

Referral Request Message: a message requesting a financial transaction that needs to be completed to allow the referee to bill for the referral.

Provisions may also be provided as shown at **472** for entering the name of the patient into a patient display field **474**. In addition, similar provisions may be provided for entering subject information, from a pre-defined list of possible subjects. The use of a pre-defined list ensures that similar matters have similar subject identifiers, which provides for consistency among messages and makes them easier to group, if desired. The input area **462** may further include an urgency field **476**, in which a simple yes/no identifier may be entered. In addition, a free form text entry box as shown at **478** may be provided for entry of free form text indicating a subject.

The input area **462** may further include a cancel button **480**, which automatically cancels the message, and a send button **482** which sends the message to the database **130** for later retrieval by the intended recipient.

Referring to Figure **2**, the user may interact with the client interface **162** as described above to generate messages manually. In other cases, messages are generated by the client interface **162** in response to specific system events, for example, when a referee **118** indicates that a referral is complete, or when either a referrer **116** or referee **118** cancels a referral.

Regardless of how a message is generated, a "message" is represented by a complex variable within the system, namely, by an instance of a message record, defined in accordance with a message data structure, as shown in Table **12** below. It will be appreciated that the message record is somewhat similar to the referral record **276**, and thus many of the functions available in this embodiment in respect of collections **274**, may also be made available in

respect of messages. In this embodiment, a message record includes fields as follows:

Table **12**. Message Record Data Structure

Date - date message sent
PHN – personal health number of patient (if any) in message
Name - name of patient (if any)
DOB - date of birth of patient (if any)
Urg - urgency of message
ToName- Name of receiver (physician)
ToID - billing number of consulting physician (unique)
FromID - billing number of referring physician (unique)
msgType - type of message
msgID - unique ID for message
ToStatusChanged - holds changes/updates notification for the Consulting MD
FromStatusChanged - holds changes/updates notification for the Referring MD
referralNotes - content of message
Subject - Subject of message
Status - status of message
PC - Patient contacted (boolean)
referralLog - activity log for message
CC[i] - billing number of i-th physician on cc list
AttachedFiles - boolean indicating whether there are files associated with message
IsArchived - boolean indicating whether message is active or in trash

When the user enters information into the user interface shown in Figure **18**, for example, temporary variables (not shown) in the memory (**112**) of the server (**102**) are created to hold the information submitted. When the user

submits the message to the server (**102**) by clicking the Send button **482**, this causes the server (**102**) to store the new message record in the database (**130**).

When the user actuates either the incoming messages button **188** or the outgoing messages button **190** code is invoked at the client computer to send a signal to the server (**102**) to cause it to send to the client computer a dynamic web page such as shown in Figure **19**, that provides a list of incoming or outgoing messages, respectively, at the client computer.

Referring to Figure **19**, the dynamic web page that shows a list of incoming messages is shown generally at **484**. The page includes a display area **486** having a name field **488**, a date field **490**, a date of birth field **492**, a subject field **494**, a sent by field **496**, an update field **498**, a to field **500**, and an urgency field **502**. The name field **488**, date field **490**, date of birth field **492**, subject field **494** and urgency field **502** are extracted from corresponding fields from the same name of the record data structure **276** of the corresponding collection **274**. The sent by field **496** is populated by indexing a look up table with the contents of the FromID field in the message record data structure. The update field **498** is populated with a yes or no depending upon the status of the ToStatusChanged field or the FromStatusChange field in the message record data structure (Table **12**). The "To" field **500** likewise is populated by the contents of the ToID field of the message record data structure. As shown in the first entry in the name field **488**, the patient name "HYDE, Lynn" is underlined to indicate that this identification is hyperlinked to the actual message record data structure for that patient. Actuation of such a hyperlink, directs the client computer to send a signal to the server computer **102** to cause it to send to the client computer a message view dynamic web page such as shown generally at **502** in Figure **20**.

Referring to Figure **20**, the message view dynamic web page **502** includes patient name, from, to, and subject information shown generally at **506**, with

buttons shown generally at **508** enabling expansion to show further patient information, further referring MD information, and further consulting MD information in dynamic web pages as shown in Figures **5**, **6**, and **7**, for example. In addition, the message view page further includes a message/ notes field **510** which includes notes entered in the subject field **478** in Figure **18**, by the originator of the message. The message view page further includes an activity log **512** indicating a date, time and user activity associated with the message.

Any new message text entered by a user will be appended to the message (in the ReferralNotes field shown in Table **12**) and a modification flag associated with the message will be set (stored in the ToStatusChanged and FromStatusChanged fields shown in Table **12**). When the party to whom the message is sent views his or her incoming messages, the client interface (**162**) will cooperate with the filter (**160**) and database interface (**158**) to identify messages which have been modified to the party. This may be accomplished by testing the ToStatusChanged or FromStatusChanged flags of Table **12** and varying the display parameters with which a representation of the modified message is displayed. A message sent by a user will always appear in that user's "outbox", and a message received by a user will always appear in that user's "inbox", even when it is modified (until it is deleted).

Administration

Referring now to Figure **21**, an "Update Conditions/Procedures Info" dynamic web page is displayed in a browser window **514** on the client computer (**104**, **106**) as shown generally at **516**.

The page includes a list **518** that displays a list of specialties which were associated with the user, shown to be "General Surgery" and "Pediatrics" in Figure **21**. The page also includes a list **520** that provides a list of additional specialties and practice areas that the user may add to the current list of specialties **518**. Similarly, entries from list **518** may be removed by the user.

The specialty practice information represented in list **518** may thus be changed by the user.

The server **102** associates each specialty or practice area with a list of needs, conditions or procedures that the user may choose to address or not to address, based on the user's specialization and/or preferences. A list of conditions **520** not seen or procedures not performed by the current user, and a list **522** of conditions seen or procedures performed by **522** the current user, are thus provided. By default, all problems and procedures for a specialty in the list **518** may be added to the "Problems/Procedures Seen" list **522**, and all problems and procedures from the "Other" list **524** may be added to the "Problems/Procedures Not Seen" list **520**. A user may choose a specialty from either list **518** or **524**, which will cause the server **102** to display all the problems and procedures associated with that specialty in lists **520** and **522**, respectively. The user may then cause the server **102** to move a selected problem or procedure from one list to the other (**520** and **522**) by using the four buttons shown generally at **526**, and may cause the server **102** to update the "Problems/Procedures Not Seen List" **520** by actuating the button entitled "Update Diagnoses Seen For This Specialty" **528**. Thus, the lists **520** and **522** may be updated by the use of the four buttons **526** and by the button **528**, and the results may be stored in the database **130** in association with a user identifier associated with the user whose profile was customized.

In this fashion, a referee (e.g., a consulting physician) can customize the types of referrals that he or she is willing to accept. The referee's customized preferences may be enforced by the validation procedure described above in connection with the submission of a referral.

The dynamic web page **516** also provides a button entitled "Customize Instructions" **530**, which facilitates a physician selecting a problem/procedure from list **522** and clicking button **530** to customize the instructions for that problem/procedure. Selecting button **530** allows the consulting physician to

update the instructions which the referral creation facility (**166**) provides to the referring physician and/or to the patient, in respect of a particular condition or procedure. Default instructions may be stored for each condition/procedure in the server database (**130**), therefore the consulting physician need not customize the default instructions unless he or she is dissatisfied with them. If, however, the consulting physician chooses to customize at least some of the instructions, the customized instructions will be stored by the client interface (**162**) in the database (**130**) in association with an identifier identifying the consulting physician, to facilitate later retrieval. The user may click the "Back" button **532** to exit the "Update Problem/Procedure Info" screen and return to a page providing other administrative functions.

In general, the administrative features of the system **100** provide for patient and doctor information entry and further facilitate the following:

a. Updating the list of problems/needs seen or not seen by the user when acting as a referee (e.g., as a consulting physician), for use as a validation criterion by the referral creation facility **166** when a prospective referrer attempts to send an electronic referral to this user;

b. Customizing referrer and/or client (e.g., patient) instructions to be dispensed by the referral creation facility **166** whenever a referral concerning a particular problem/need is referred to the user;

c. Customizing a list of diagnostic questions to be presented by the referral creation facility **166** to a referrer as a referral relating to a particular problem/need is being created by the referrer;

d. Customizing an urgency level to be automatically associated with a particular referral problem/need by the referral creation

facility **166**, possibly based on answers to the aforesaid diagnostic questions;

e. Customizing automatic waitlist prioritization rules for classifying an incoming collection into a custom waitlist priority associated with this user based on the referral problem/need;

f. Customizing the procedures that must have been performed, or the information that must have been gathered, by a referrer before a referral for a particular problem or procedure will be accepted by this user; for example, a consulting physician could customize the medical tests required in order to accept a referral to treat a specific disease. Moreover, the medical tests required may vary based on responses to the diagnostic questions. These customized requirements may be used as a validation criterion by the referral creation facility **166** when an attempt is made to send a referral to this user;

g. Changing the user's status in the system **100**, for example, designating that the user is out of the office, is not accepting new referrals, or is not accepting any referrals; and

h. Creating or changing a report template (e.g., a default form to be used for consultation letters upon completion of a referral).

Exemplary Transactions

Referring back to Figure **1**, generally, the system **100** facilitates systematic and ongoing sharing of referral information between a referrer **116** and referee **118** by providing a workflow of predefined interactions between the parties **116**, **118** through the server **102**. Advantageously, the system **100** provides notifications to one party to a referral, of predefined transactions made in respect of the referral by another party to the referral. An overview of exemplary transactions

of one embodiment will now be provided with particular reference to Figures **22A, 22B** and **23**.

Figure **23** provides a high-level simplified communication flow diagram of several common interactions in this embodiment between the referrer **116** and referee **118**, as shown generally at **534**. Actions **536** or events associated with the referring physician are shown generally at **538**, whereas actions **540** or events associated with the consulting physician are shown generally at **542**. Communication signals and actions taken by the server (**102**) are represented by the middle section of Figure **23**, shown generally at **544**.

Figures **22A** and **22B** provide a low-level flowchart illustrating an exemplary series of transactions between a client computer and the server (**102**) as shown generally at **546**. The left hand column **548** represents actions taken by a client computer (**104** or **106**) while interacting over a network with the server (**102**), which is represented in the right hand column, shown generally at **550**. Specific signals exchanged between the client computer (**104**, **106**) and the server (**102**) are represented in the middle column, shown generally at **552**.

Referring to Figures **22A** and **22B**, the referrer (**116**) and referee (**118**) must be pre-authorized to establish a session with the server (**102**) to use the system (**100**). A session with the server (**102**) begins when a user at a client computer (**104** or **106**) enters information into a login screen, as shown in block **554**. In particular, the user enters a user key **556** associated with the user. The user key may be a user name and/or password. The user key **556** is received by the authentication facility (**164**) of the server (**102**), which ascertains whether the user key received corresponds to an authorized user of the system (**100**). If yes, at block **558**, the authentication facility (**164**) identifies the client computer (**104**, **106**) as being associated with a user identifier associated with the user key **556** and representing the user. At blocks **559** and **560**, the server (**102**) causes a summary associated with the user to be presented at the client computer (**104**, **106**) associated with the

user. The summary may be as shown in Figure **3**, for example. Moreover, the user is presented with a choice of selectable predefined criteria for filtering the database (**130**), the criteria being established based on the user identifier and selection of buttons **184**, **186**, **200**, **356**, **358**, etc., for example.

Referring to Figure **23**, block **562** illustrates the referrer **116** sending (or replying) to a message to (or from) the referee **118** using the "Send Message" menu option (**196** in Figure **3**). When the message is sent, the server (**102**) will provide the referee **118** with a notification that a message was received, as shown at **564**. The notification may involve the message appearing in a message inbox (i.e., "Incoming Messages") of the recipient as shown in Figure **19**. When the referee **118** reads the message **566**, the server (**102**) sends a notification to the referrer **116** as shown at block **568**. This notification may involve the message being identified to the referrer as having been read (e.g., by being displayed with distinguishing indicia), based on a modification flag (as indicated by the ToStatusChanged and FromStatusChanged fields in Table **12**) of a corresponding instance of a message data structure (e.g., message record) having been set. The above-described messaging steps also work analogously in the opposite direction as shown by blocks **570, 572, 574** and **576**.

Block **578** in Figure **23** illustrates the referee **116** invoking the referral creation facility (**166**) through button **182** in Figure **3**, to send a new referral to the referee **118**. When the referrer **116** sends the new referral, this causes the server (**102**) to create a new collection (**274**), including a new referral record (**276**), and to add it to the database (**130**), as shown at block **580** in Figure **23**. As shown at block **582**, the server (**102**) provides a notification to the referee **118** that a new referral has been received. As shown at block **584**, when the referee **118** reads or modifies the referral, the referral collection **274** is updated accordingly as shown at block **583**, and the referrer **116** is provided with notification of the update as shown at block **588**. Similarly, the referrer **116** may modify the referral collection **274** as shown at block **590**, causing the

server (**102**) to update it accordingly as shown at block **586** and to notify the referee **118** of this modification as shown at block **592**.

Referring to Figures **22**A and **22**B, creation of a referral is shown in greater detail. To create a referral, as shown at **594** and **548**, actuation of the Make Referral button **182** in Figure **3** sends a signal from the referrer computer **104** to the server **102** indicating that the referral creation facility (**166**) should be invoked. The referral creation facility (**166**) causes a user interface for referral creation to be presented to the referrer **116** at the referrer computer **104** to solicit responses from the referrer (as shown at **596**, **598**). The user interface for referral creation is represented by the dynamic web pages shown in Figures **4, 5, 6, 7, 8, 9, 10, 11** & **12**, for example. In general, the referrer **116** enters or selects referral information pertaining to a referral in the user interface as shown at **599**. Several iterations of data entry and interaction with the server **102** may be necessary as shown at **600**. Specifically, several sets of data may be transmitted from the client computer **104** to the server **102**. In turn, the server **102** may transmit one or more questions to be answered by the referrer **116** at the client computer **104**, and the referrer's responses may be transmitted back to the server **102**. The referrer **116** may also upload files to the server **102**. The server **102** may test some of the data against validation criteria, and subsequent data or questions transmitted back to the referrer computer **104** may depend on whether the validation criteria were satisfied. Once the user is satisfied that all necessary data has been transmitted to the server **102**, the user actuates the submit referral button **272** in Figure **13** to issue a create referral command, as shown at **602**, which is transmitted to the server **102**. Additional validation criteria may be applied at this stage as shown at **604**. If the validation criteria are not satisfied, the server **102** may generate warning notifications as shown at **606**, **608** or may refuse to accept the referral. Otherwise, the referral creation facility (**166**) causes the information pertaining to the referral to be stored in the database (**130**) as a collection **274** of linked information units. In this embodiment, the referral status flag (**314** in Figure **14**) is set to indicate that the collection (**274**)

is as yet unread by the referee **118**. The referral creation facility (**166**) may also cause instructions to be displayed to the referrer **116** for the referrer or for the patient, as shown at **606**, **608**.

Assuming the referee **118** also establishes a session from the referee computer **106**, the referee will be notified in a user summary screen (e.g., as shown at **559** and in Figure **3**), that there is an additional new referral addressed to him or her. The referee **118** may then invoke a predefined filter criterion for identifying new referrals as shown at **610**, which will cause the filter (**160**) to identify unread collections (**274**) in the database (**130**) which are addressed to the referee **118**, as shown at **612**. The server **102** will then display identifications of collections satisfying the filter criteria, to the referee **118**, as shown at **614**. If the referee **118** selects the identification of the aforesaid collection (**274**) created by the referrer **116**, a selection signal is transmitted as shown at **616** to the server **102**, whereupon the information display facility (**167**) causes display of information units from the selected collection at the referee computer **106**, as shown at **618**, **620**. At the same time, the information display facility (**167**) updates the referral status flag (**314** in Figure **14**) and activity log (**330**), to indicate that the selected referral was viewed from the referee computer **106**.

The referee **118** may choose to respond to the new referral by setting an appointment date, for example. To accomplish this, the referee **118** uses the information modification facility (**168**) to modify an appointment status of the selected collection, as shown at **622**. As shown at **642**, this may involve exchanging modification information **640** with the server **102**, such as data pertaining to an appointment time. When the referee **118** issues the modification command **638**, this causes the information modification facility (**168**) to modify the collection (**274**) in accordance with the modification command. Moreover, the activity log (**330**) and appropriate flags associated with the collection (**274**) are updated to record the fact of this transaction. In this embodiment, the modification command is recorded in the modification

flag (as represented by ToStatus Changed (**298**) and FromStatusChanged (**300**) fields) of the collection (**274**), and the modification information may be stored in these or other fields of the collection (**274**). If multiple modifications are made (e.g., an appointment is set, and referral notes are added), all these modifications may be stored as part of the collection (**274**) by modifying the appropriate fields.

When the referrer **116** accesses the system **100** again, the user summary (e.g., Figure **3**) seen by the referrer will display a notification that an additional outgoing referral was updated. The referrer **116** may then select a predefined filter option operable to identify updated outgoing referrals. As shown at **614**, **616**, **618** and **620**, when the collection (**274**) at issue is identified to the referrer **116**, the referrer may select its identification to cause the information display facility (**167**) to display the modifications made by the referee **118** in detail (e.g., an appointment was set, and the referee **118** may have also sent some specific notes with instructions). (Alternatively, some changes may be displayed as part of the identification itself.) Invoking the information display facility (**167**) will also update the activity log and reset the modification flag of the collection (**274**) to indicate that the referrer **116** is deemed to be aware of the modifications made by the referee **118** to the collection (**274**), and hence, of the progress of the real-life referral it represents.

Referring back to Figure **23** as shown by blocks **628** and **630**, either the referrer **116** or the referee **118** may cancel a referral. When this occurs, the server (**102**) updates the referral collection (**274**), as shown at block **632**, and notifies the other party, as shown at blocks **634** and **656**. In greater detail, referring to Figure **22A**, as shown at **622**, **638, 640** and **642**, the referrer **116** or referee **118** again engage in low-level interactions with the server **102**. As before, a cancellation command causes a specific modification of the collection (**274**). In addition, in this embodiment, it involves sending a cancellation message to the other party, as shown at **642**. Both the modification and the cancellation message are detectable by the other party

by appropriately controlling **560** the filter (**160**), and may be viewed by controlling **616** the information display facility (**167**). The latter step causes the activity log (**330** in Figure **14**) and various flags of the collection (**274**) to be updated or reset. In this manner, all parties to a referral can be informed of the progress of the referral, and detailed information about all significant transactions is accumulated.

Referring back to Figure **23**, when the referee **118** reports that a referral is complete, such as by actuating the "complete" button **434** shown in Figure **16**, for example, as shown at block **644**, the referral collection (**274**) is updated accordingly, and a Referral Complete Message is sent to the referrer **116** as shown at blocks **646** and **648**. (The low-level interactions with the server **102** are similar to those described above.) After a referral has been handled, the referrer **116** and referee **118** may submit a request via the server **102** for payment as shown at blocks **650** and **652**.

While specific embodiments of the invention have been described and illustrated, such embodiments should be considered illustrative of the invention only and not as limiting the invention as construed in accordance with the accompanying claims.

What is claimed is:

1. A method of managing referrals from a referrer to a referee, the method comprising:

in response to a first set of signals received from a referrer computer, causing a database to store information pertaining to a referral from said referrer to said referee, as a collection of linked information units, said information units including a referrer identifier identifying said referrer as originator of said information and a referee identifier identifying said referee as intended recipient of said information, said collection representing said referral and being accessible by said referrer computer and by a referee computer;

in response to a second set of signals received from one of said referrer and referee computers, causing collections of information units that satisfy a criterion, to be identified and causing identifications of said collections to be displayed, at said one of said referrer and referee computers,

in response to a third set of signals received from said one of said referrer and referee computers, causing at least one information unit in a collection corresponding to a displayed identification, to be displayed at said one of said referrer and referee computers; and

in response to a fourth set of signals received from said one of said referrer and referee computers, causing at least one information unit in said collection corresponding to a displayed identification, to be modified.

2. The method of claim **1** wherein causing information to be stored comprises causing a referral status flag, representing a status of said referral to be stored, in an information unit of said collection, and causing said referral status flag to be set to a first value to indicate that the collection has not yet been viewed by the referee.

3. The method of claim **2** further comprising causing said referral status flag to be set to a second value if at least one information unit of said collection has been displayed at said referee computer.

4. The method of claim **2** wherein identifying collections comprises identifying collections having a referral status flag satisfying a referral status criterion.

5. The method of claim **1** further comprising (a) facilitating uploading of a file from one of said referrer and referee computers in response to upload signals received therefrom; (b) causing said file to be stored in association with a collection associated with both said referrer and said referee; and (c) facilitating downloading of said file to one of said referrer and referee computers in response to download signals received therefrom.

6. The method of claim **1** wherein identifying collections comprises establishing said criterion based on at least one of said referrer identifier and said referee identifier.

7. The method of claim **6** wherein establishing said criterion comprises causing said criterion to be set to a predefined criterion selected from a set of predefined criteria, in response to a selection signal, in said second set of signals, selecting said predefined criterion, each

predefined criterion in said set being based on one of said referrer identifier and said referee identifier.

8. The method of claim **1** wherein identifying collections comprises identifying collections including at least one of said referrer identifier and said referee identifier.

9. The method of claim **1** wherein causing at least one information unit to be modified comprises causing a modification flag to be set in an information unit associated with said collection corresponding to a displayed identification.

10. The method of claim **9** wherein causing said modification flag to be set comprises causing a modification flag value to be stored as said modification flag to represent a modification command received in said fourth set of signals.

11. The method of claim **9** further comprising, if said collection corresponding to a displayed identification is caused to be displayed at one of said referrer and referee computers, causing said modification flag to be reset.

12. The method of claim **9** wherein identifying collections comprises identifying collections having a modification flag satisfying a modification criterion so that identifications corresponding to collections having information units that have been modified in accordance with said modification criterion, are displayed.

13. The method of claim **9** further comprising causing to be presented , a representation of said modification flag, at at least one of said referrer and said referee computers.

14. The method of claim **1** wherein causing identifications to be displayed comprises listing labels respectively associated with said collections to be shown in a display image.

15. The method of claim **14** wherein causing identifications to be displayed comprises using different display parameters for different labels to distinguish at least one label from another.

16. The method of claim **15** further comprising causing a set of display parameters associated with a selection criterion to be associated with labels of collections that satisfy said selection criterion.

17. The method of claim **1** wherein causing information to be stored comprises causing information including at least one of a client name or identifier, a client date of birth, a need, an urgency status associated with said need, a referrer name, and a referee name to be stored.

18. The method of claim **1** wherein causing information to be stored causing a class identifier classifying said referral into a pre-defined classification to be produced, in response to said first set of signals, and causing said class identifier to be stored in an information unit associated with said collection.

19. The method of claim **18** further comprising causing at least one question to be presented to an operator of said referrer computer, receiving a response to said at least one question, and causing said class identifier to be produced in response to said response to said at least one question.

20. The method of claim **18** wherein causing collections to be identified includes causing collections that have class identifiers satisfying a criterion to be identified.

21. The method of claim **1** further comprising causing at least one question to be presented to an operator of said referrer computer and receiving a response to said at least one question.

22. The method of claim **21** further comprising causing said response to said at least one question to be stored in information units associated with said collection.

23. The method of claim **21** further comprising causing a notification to be transmitted to said referrer computer when said response to said at least one question does not satisfy a validation criterion.

24. The method of claim **1** wherein causing identifications to be displayed comprises causing identifications to be displayed in an order dependent upon at least one information unit in each collection.

25. The method of claim **1** further comprising causing an event log to be associated with said collection and adding an entry to be added to said event log in response to occurrence of an event involving modification of at least one information unit of said collection in response to said fourth set of signals.

26. The method of claim **25** wherein causing an entry to be added said event log comprises causing a chronological order indicator to be associated with an identification of said event.

27. The method of claim **26** wherein said identification of said event includes an identification of said referrer or referee computer from which said fourth set of signals were received.

28. The method of claim **25** further comprising facilitating viewing of said event log from at least one of said referrer and said referee computers.

29. The method of claim **1** further comprising, in response to receiving said fourth set of signals from said one of said referrer and referee computers, causing a message to be sent to the other of said one of said referrer and said referee computers.

30. The method of claim **1** further comprising causing information units and computer readable codes to be transmitted from said database, to one of said referrer and referee computers, said computer-readable codes being operable to cause a processor circuit at said one of said referrer and referee computers,

(i) to cause at least some of the transmitted information to be displayed at said one of said referrer and referee computers; and

(ii) to facilitate generation, in response to user input at said one of said referrer and referee computers, of communication signals for transmission from said one of said referrer and referee computers, said communication signals including at least one of said first, second, third and fourth sets of signals.

31. The method of claim **30** wherein said computer-readable codes are interpretable by a markup language interpreter.

32. The method of claim **1** wherein said third set of signals includes a selection signal indicating selection of said collection corresponding to a displayed indication.

33. The method of claim **1** wherein said third and fourth sets of signals are the same.

34. The method of claim **1** wherein causing at least one information unit in said collection corresponding to a displayed indication to be modified comprises limiting which information units may be modified according to whether said fourth set of signals are received from said referrer computer or said referee computer.

35. The method of claim **1** further comprising causing a computer to be identified as being associated with said referrer or said referee, in response to a respective referrer or referee key associated with said referrer or referee respectively, received from said computer.

36. The method of claim **1** further comprising linking said identifications with a display interface operable to cause information units in a corresponding collection to be displayed.

37. A signal encoded with computer-readable codes for directing a processor circuit to perform the method recited in claim **1**.

38. A computer-readable medium comprising codes for directing a processor circuit to perform the method recited in claim **1**.

39. A computer-generated user interface soliciting responses from a user that are provided to a computer having a memory with computer-executable codes operable to cause said computer to perform the method of claim **1**, in response to said responses.

40. An apparatus to facilitate management of referrals from a referrer to a referee, the apparatus comprising:

storing means, responsive to a first set of signals received from a referrer computer, for storing, in a database, information pertaining to a referral from said referrer to said referee, said

information being stored as a collection of linked information units, said information units including a referrer identifier identifying said referrer as originator of said information and a referee identifier identifying said referee as intended recipient of said information, said collection representing said referral and being accessible by said referrer computer and a referee computer;

collection identification means, responsive to a second set of signals received from one of said referrer and referee computers, for identifying, in said database, collections of information units that satisfy a criterion, and for causing identifications to be displayed at said one of said referrer and referee computers, said identifications corresponding to respective collections of information units satisfying said criterion;

information display means, responsive to a third set of signals received from said one of said referrer and referee computers, for causing at least one information unit in a collection corresponding to a displayed identification, to be displayed at said one of said referrer and referee computers; and

information modification means, responsive to a fourth set of signals received from said one of said referrer and referee computers, for causing at least one information unit in said collection corresponding to a displayed identification, to be modified.

41. An apparatus to facilitate management of referrals from a referrer to a referee, the apparatus comprising:

a database interface operable to control a database, said database interface being operable to cause the database to store information from a referrer computer, said information pertaining to a referral from said referrer to said referee, said information being stored as a collection of linked information units, said information units including a referrer identifier identifying said referrer computer as originator of said information and a referee identifier identifying a referee computer as intended recipient of said information, said collection representing said referral;

a filter operable to cause said database interface to identify, in said database, collections of information units that satisfy a criterion, and to cause identifications to be displayed at one of said referrer and referee computers, said identifications corresponding to respective collections of information units satisfying said criterion; and

a client interface cooperating with said database interface and filter and operable to communicate with and be controlled from said referrer and referee computers, said client interface comprising:

a referral creation facility operable to facilitate causing said database interface to store said information as said collection in response to signals received from said referrer computer;

an information display facility operable to facilitating viewing, from said one of said referrer and referee computers, of at least one information unit in a collection identified by said filter; and

an information modification facility operable to facilitate causing a modification, from said one of said referrer and referee computers, of at least one information unit in a collection identified by said filter;

wherein said filter is operable to identify said collection when said collection satisfies said criterion and to cause an identification corresponding to said collection to be displayed at said one of said referrer and referee computers.

42. The apparatus of claim **41** wherein said database interface, said filter and said client interface are implemented by a processor circuit.

43. The apparatus of claim **42** wherein said processor circuit includes a processor and memory in communication with said processor, said memory being encoded with codes for directing said processor to effect said database interface, said filter and said client interface.

44. The apparatus of claim **43** wherein said codes include codes for directing said processor to cause a referral status flag to be stored in an information unit of said collection and to set said referral status flag to a set to a first value to indicate that the collection has not yet been viewed by the referee.

45. The apparatus of claim **44** wherein said codes include codes for directing said processor to cause said referral status flag to be set to a second value if at least one information unit of said collection has been displayed at said referee computer.

46. The apparatus of claim **43** wherein said codes include codes for directing said processor to cause, in said database, to identify said collections of information units that satisfy said criterion.

47. The apparatus of claim **46** wherein said codes include codes for directing said processor to cause said database to identify collections having a referral status flag satisfying a referral status criterion.

48. The apparatus of claim **46** wherein said codes comprise codes for directing said processor to cause said database to identify collections including at least one of said referrer identifier and said referee identifier.

49. The apparatus of claim **41** wherein said client interface is further operable to cooperate with said database interface to:

(a) facilitate uploading a file, into said database, from one of said referrer and referee computers in response to upload signals received therefrom; and

(b) facilitate downloading said file, from said database, to one of said referrer and referee computers in response to download signals received therefrom.

50. The apparatus of claim **43** wherein said codes include codes for directing said processor to cause said database to store a modification flag in an information unit of said collection and to cause said database to set said modification flag to a first value to indicate that the collection has not yet been modified.

51. The apparatus of claim **50**, wherein said codes include:

codes for directing said processor to cause said database to cause said modification flag to be set to a second value when said information modification facility is controlled, from said one

of said referrer and referee computers, to cause a modification to said collection identified by said filter; and

codes for directing said processor to cause the database to cause modification flag to be set a third value when said information display facility is controlled, from the other of said referrer and referee computers, to cause display of said collection identified by said filter.

52. The apparatus of claim **50** wherein said codes include codes for directing said processor to cause the database to store a value in said modification flag, said value representing a modification command received by said information modification facility from said one of said referrer and referee computers.

53. The apparatus of claim **52** wherein said codes comprise codes for directing said processor to cause the database to identify collections having a modification flag satisfying a modification criterion so that identifications corresponding to collections having information units that have been modified in accordance with said modification criterion, are displayed.

54. The apparatus of claim **52** wherein said codes include codes for directing said processor to cause a representation of said modification flag to be presented at at least one of said referrer and said referee computers.

55. The apparatus of claim **41** wherein said information display facility cooperates with said filter to cause labels respectively associated with said collections satisfying said criterion to be displayed at said one of said referrer and referee computers using a first set of display parameters.

56. The apparatus of claim **55** wherein said information display facility cooperates with said filter to cause labels associated with collections satisfying an additional selection criterion to be displayed at said one of said referrer and referee computers using a second set of display parameters in order to distinguish labels associated with collections which satisfy said additional selection criterion from labels associated with collections that do not.

57. The apparatus of claim **41** wherein said collection includes at least one of a client name or identifier, a client date of birth, a need, an urgency status associated with said need, a referrer name, and a referee name.

58. The apparatus of claim **41** wherein said referral creation facility is operable to produce a class identifier classifying said referral into a pre-defined classification in response to receiving said information, said referral creation facility being operable to cause said database interface to store said class identifier in information units associated with said collection.

59. The apparatus of claim **41** wherein said client interface is operable to cause at least one question to be presented to an operator of said referrer computer, to receive a response to said at least one question, and to cause said database interface to store said response.

60. The apparatus of claim **55** wherein said client interface is operable to cause a notification to be transmitted to said referrer computer when said response to said at least one question does not satisfy a validation criterion.

61. The apparatus of claim **41** wherein said filter causes identifications to be displayed in an order dependent upon at least one information unit in each collection corresponding to a displayed identification.

62. The apparatus of claim **41** wherein said database interface is operable to cause the database to maintain an event log for each collection and wherein said client interface is operable to cause said database interface to update said event log to cause an entry to be added to said event log in response to occurrence of an event involving said information modification facility being controlled from one of said referrer and referee computers to cause a modification to at least one information unit of said collection, wherein said entry includes at least one of a chronological order indicator, an identification of said event, and an identification of said one of said referrer and referee computers from which said modification was caused.

63. The apparatus of claim **62** wherein said information display facility is operable to be controlled from said one of said referrer and referee computers to cause display of said event log thereat.

64. The apparatus of claim **52** wherein said information modification facility responds to receiving said modification command from one of said referrer and referee computers by facilitating sending a message therefrom to the other of said referrer and referee computers.

65. The apparatus of claim **41** wherein said client interface is operable to cause information units from said database and computer-readable codes, to be transmitted to one of said referrer and referee computers, said computer-readable codes being operable to cause a processor circuit at said one of said referrer and referee computers,

(i) to cause at least some of said transmitted information to be displayed at said one of said referrer and referee computers; and

(ii) to facilitate generation, in response to user input at said one of said referrer and referee computers, of communication signals for transmission from said one of said referrer and referee computers to said client interface.

66. The apparatus of claim **41** wherein said client interface is operable to receive, from said one of said referrer and referee computers, a selection signal indicating selection of said collection identified by said filter, and to cause said information display facility to cause an information unit of said collection identified by said filter to be displayed at said one of said referrer and referee computers in response thereto.

67. The apparatus of claim **41** wherein said client interface further comprises an authentication facility operable to identify a computer from which signals are received as being associated with a user, in response to receiving from said computer a user key associated with a user identifier identifying said user.

68. The apparatus of claim **67** wherein said client interface is further operable to establish said criterion based on said user identifier.

69. The apparatus of claim **41** wherein said client interface is further operable to cause said filter to use, as said criterion, a predefined criterion selected from a set of predefined criteria, in response to a selection signal received from said computer, indicating said predefined criterion.

70. A data structure facilitating the communication of information pertaining to a referral from a referrer to a referee, the structure comprising:

a collection of linked information units pertaining to the referral, at least some of said information units of said collection being operable to be modified, said information units of said collection including:

a referrer identifier identifying a referrer computer as being originator of said collection, said referrer computer being associated with said referrer;

a referee identifier identifying a referee computer as an intended recipient of said collection, said referee computer being associated with said referee; and

a modification flag operable to indicate that a modification was made, from one of said referrer and referee computers, to at least one information unit of said collection.

71. A computer-readable medium encoded with the data structure of claim **70**.

72. The data structure of claim **70** wherein said information units of said collection further include an event log operable to store an entry indicating occurrence of an event.

73. The data structure of claim **70** wherein said information units of said collection further include a referral status field operable to indicate a referral status comprising at least one of:

an unread status signifying that said collection has not been viewed from said referee computer;

an appointment set status signifying that an appointment has been set for the referral represented by said collection;

a cancelled status signifying that the referral represented by said collection has been cancelled; and

a completed status signifying that the referral represented by said collection has been completed by said referee.

74. The data structure of claim **70** wherein said information units of said collection further include at least one of a client name or identifier, a client date of birth, a need in respect of which the referral is made, an urgency status associated with said need, a referrer name, and a referee name.

75. The data structure of claim **70** wherein said information units of said collection further include at least one of:

a wait list priority field indicating a priority of the referral represented by said collection in a waitlist of said referee;

a wait list status field indicating a status of the referral in said waitlist; and

a waitlist reason field indicating a reason for placing the referral on said waitlist.

76. The data structure of claim **70** wherein said information units of said collection further include at least one of a referral date sent field, a

referral type field, a referral identifier field, a notes field, a client contacted field indicating whether said client was contacted about the referral, a certainty flag for indicating a level of certainty regarding a diagnosis, a referral status field, an appointment time field, a referral reason field, an appointment cancellation reason field, a carbon copy field, a payer field, an attached files status field, and an archived status field.

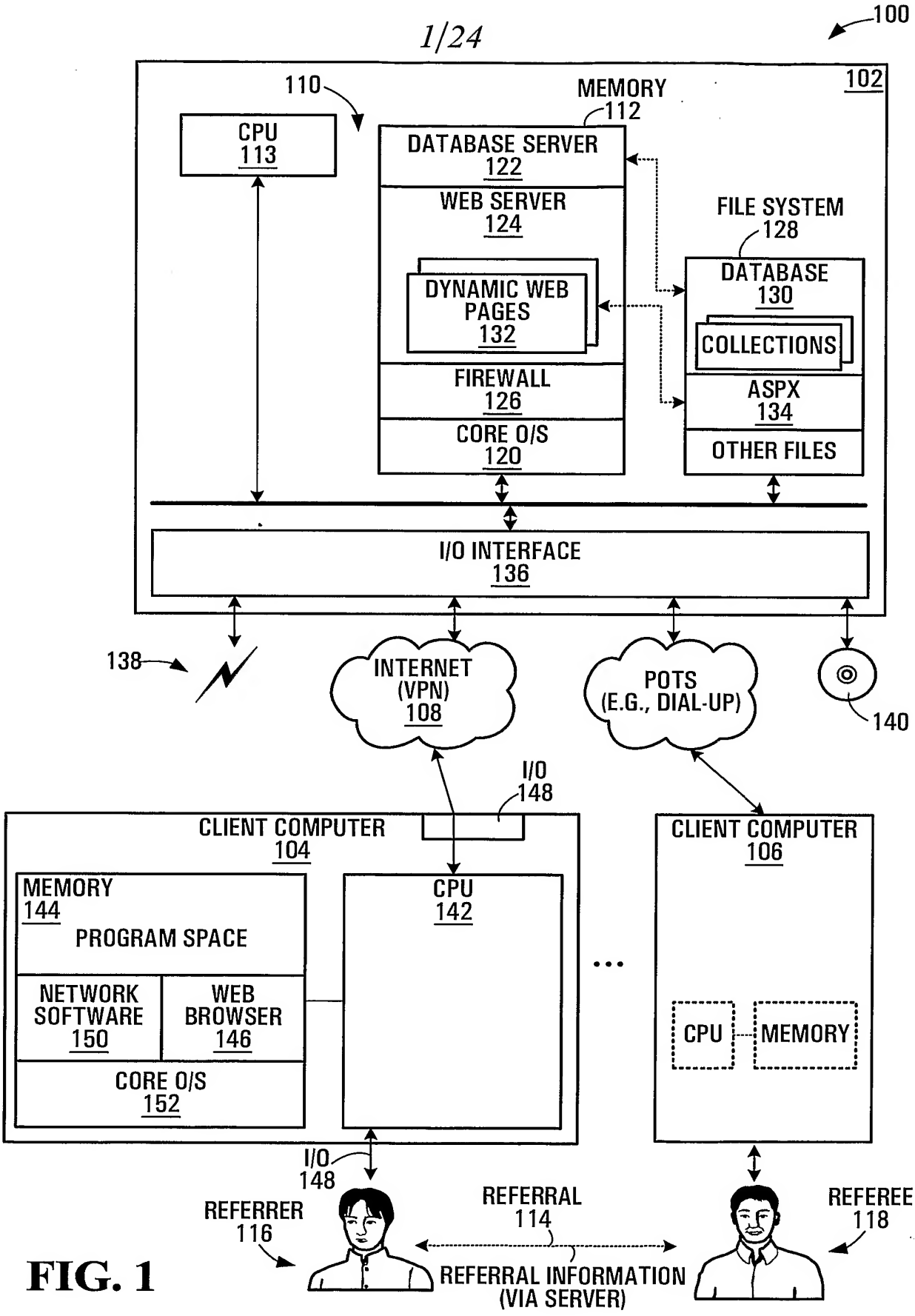
100
102
110
MEMORY
112
CPU
113
DATABASE SERVER
122
WEB SERVER
124
FILE SYSTEM
128
DYNAMIC WEB PAGES
132
DATABASE
130
COLLECTIONS
FIREWALL
126
ASPX
134
CORE O/S
120
OTHER FILES
I/O INTERFACE
136
138
INTERNET (VPN)
108
POTS (E.G., DIAL-UP)
140
I/O
148
CLIENT COMPUTER
104
CLIENT COMPUTER
106
MEMORY
144
PROGRAM SPACE
CPU
142
NETWORK SOFTWARE
150
WEB BROWSER
146
CORE O/S
152
CPU
MEMORY
I/O
148
REFERRER
116
REFERRAL
114
REFEREE
118
REFERRAL INFORMATION (VIA SERVER)

FIG. 1

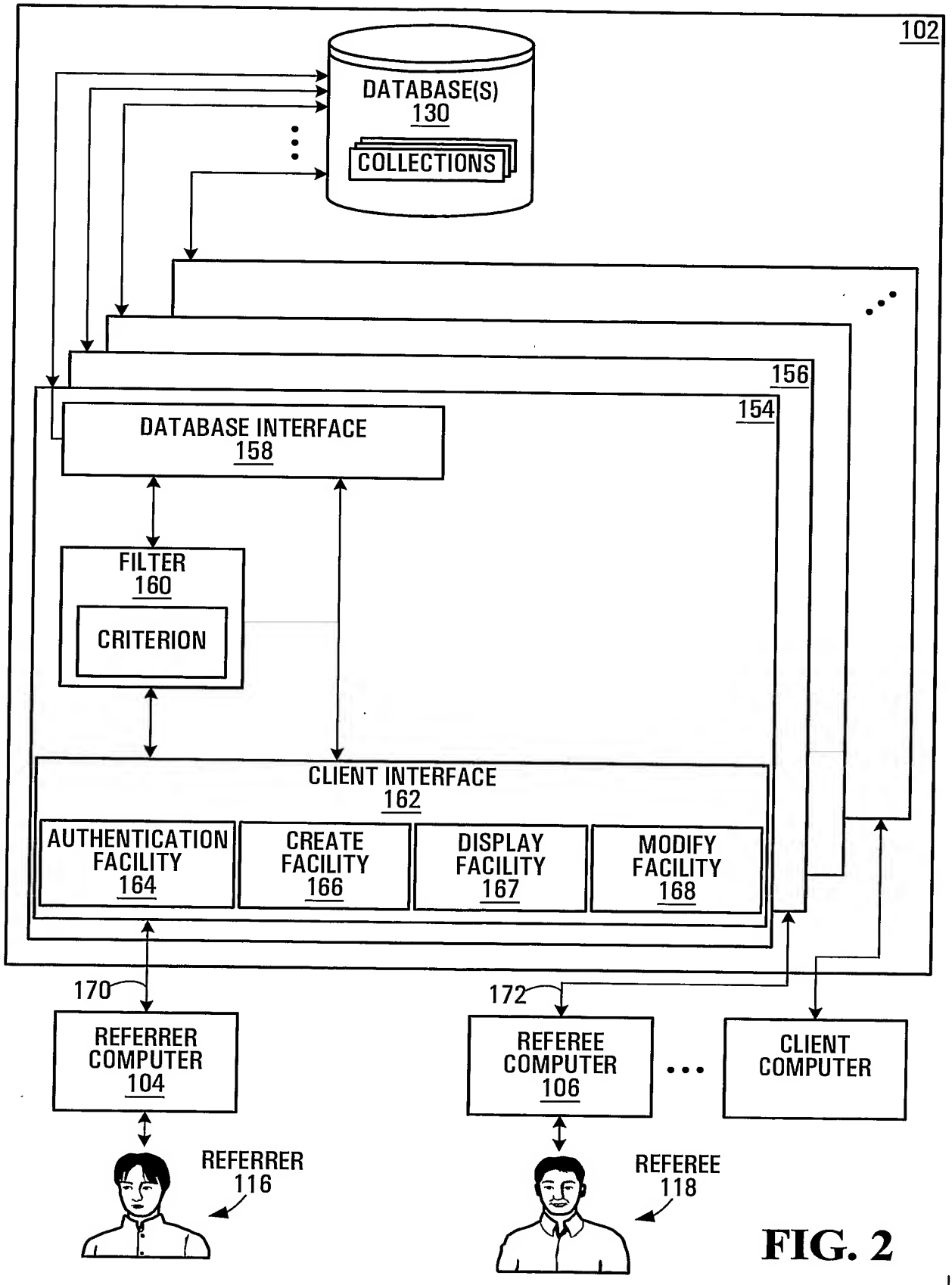
102
DATABASE(S)
130
COLLECTIONS
156
154
DATABASE INTERFACE
158
FILTER
160
CRITERION
CLIENT INTERFACE
162
AUTHENTICATION FACILITY
164
CREATE FACILITY
166
DISPLAY FACILITY
167
MODIFY FACILITY
168
170
172
REFERRER COMPUTER
104
REFEREE COMPUTER
106
CLIENT COMPUTER
REFERRER
116
REFEREE
118

FIG. 2

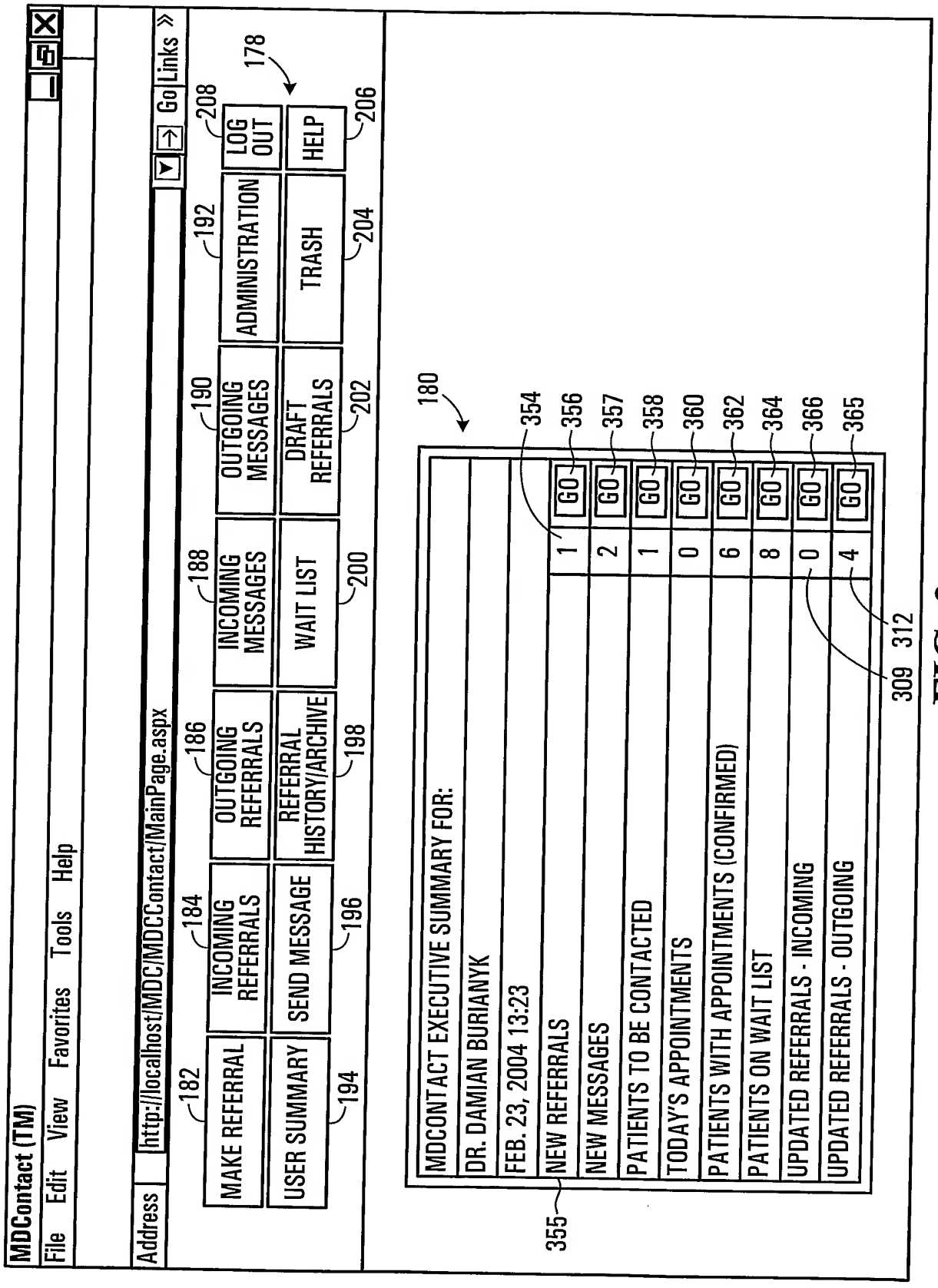
176
MDContact (TM)
File Edit View Favorites Tools Help
Address http://localhost/MDC/MDCContact/MainPage.aspx
Go Links
178
182 MAKE REFERRAL
184 INCOMING REFERRALS
186 OUTGOING REFERRALS
188 INCOMING MESSAGES
190 OUTGOING MESSAGES
192 ADMINISTRATION
208 LOG OUT
194 USER SUMMARY
196 SEND MESSAGE
198 REFERRAL HISTORY/ARCHIVE
200 WAIT LIST
202 DRAFT REFERRALS
204 TRASH
206 HELP
180
MDCONTACT EXECUTIVE SUMMARY FOR:
DR. DAMIAN BURIANYK
FEB. 23, 2004 13:23
355
NEW REFERRALS 1 GO 354 356
NEW MESSAGES 2 GO 357
PATIENTS TO BE CONTACTED 1 GO 358
TODAY'S APPOINTMENTS 0 GO 360
PATIENTS WITH APPOINTMENTS (CONFIRMED) 6 GO 362
PATIENTS ON WAIT LIST 8 GO 364
UPDATED REFERRALS - INCOMING 0 GO 366
UPDATED REFERRALS - OUTGOING 4 GO 365
309 312

FIG. 3

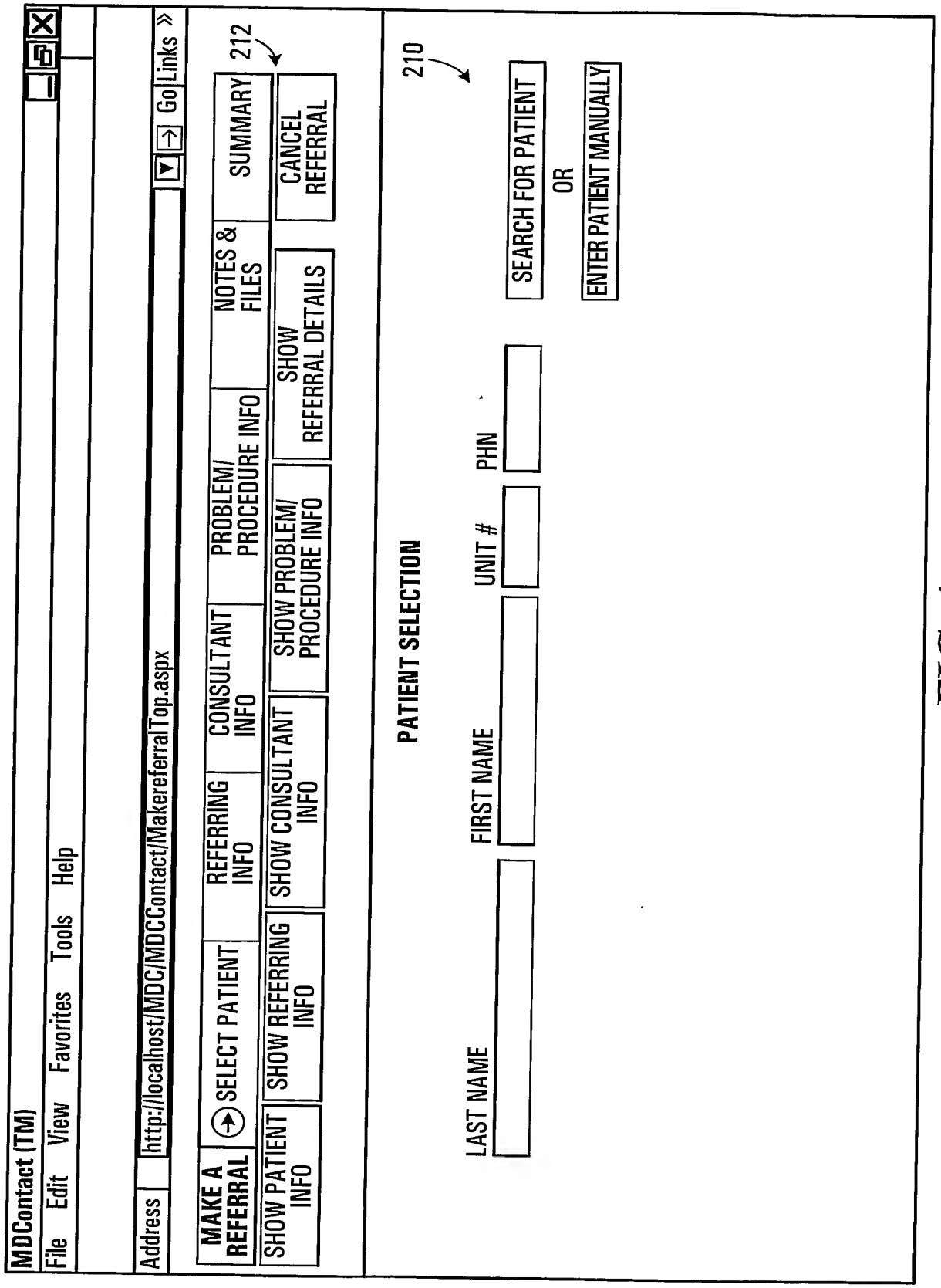
MDContact (TM)
File Edit View Favorites Tools Help
Address http://localhost/MDC/MDCContact/MakereferralTop.aspx
Go Links
MAKE A REFERRAL
SELECT PATIENT
REFERRING INFO
CONSULTANT INFO
PROBLEM/ PROCEDURE INFO
NOTES & FILES
SUMMARY
212
SHOW PATIENT INFO
SHOW REFERRING INFO
SHOW CONSULTANT INFO
SHOW PROBLEM/ PROCEDURE INFO
SHOW REFERRAL DETAILS
CANCEL REFERRAL
210
PATIENT SELECTION
LAST NAME
FIRST NAME
UNIT #
PHN
SEARCH FOR PATIENT
OR
ENTER PATIENT MANUALLY

FIG. 4

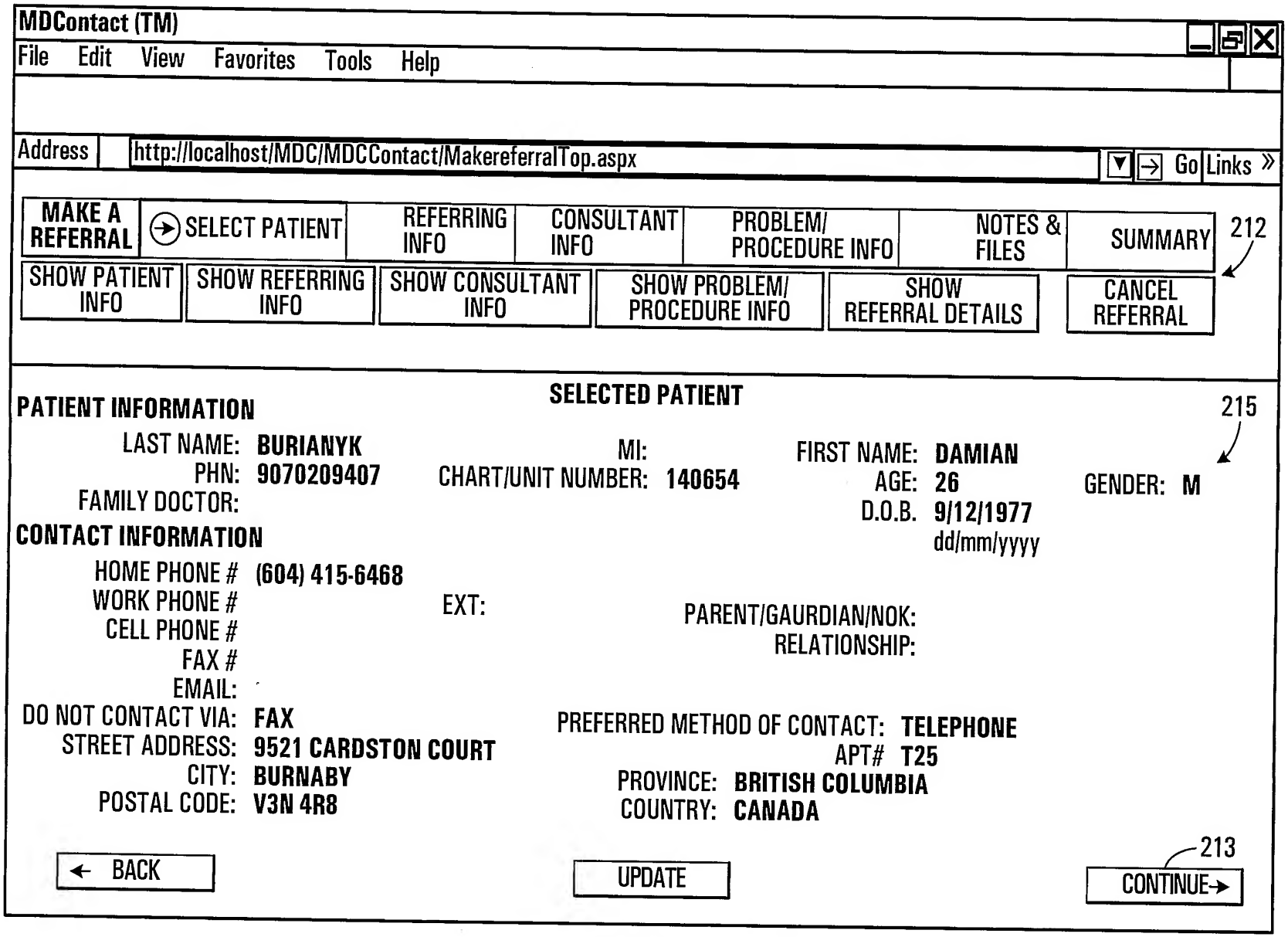
MDContact (TM)
File Edit View Favorites Tools Help
Address http://localhost/MDC/MDCContact/MakereferralTop.aspx
Go Links
MAKE A REFERRAL
SELECT PATIENT
REFERRING INFO
CONSULTANT INFO
PROBLEM/ PROCEDURE INFO
NOTES & FILES
SUMMARY
212
SHOW PATIENT INFO
SHOW REFERRING INFO
SHOW CONSULTANT INFO
SHOW PROBLEM/ PROCEDURE INFO
SHOW REFERRAL DETAILS
CANCEL REFERRAL
SELECTED PATIENT
PATIENT INFORMATION
215
LAST NAME: BURIANYK
MI:
FIRST NAME: DAMIAN
PHN: 9070209407
CHART/UNIT NUMBER: 140654
AGE: 26
GENDER: M
FAMILY DOCTOR:
D.O.B. 9/12/1977
dd/mm/yyyy
CONTACT INFORMATION
HOME PHONE # (604) 415-6468
WORK PHONE #
EXT:
PARENT/GAURDIAN/NOK:
CELL PHONE #
RELATIONSHIP:
FAX #
EMAIL:
DO NOT CONTACT VIA: FAX
PREFERRED METHOD OF CONTACT: TELEPHONE
STREET ADDRESS: 9521 CARDSTON COURT
APT# T25
CITY: BURNABY
PROVINCE: BRITISH COLUMBIA
POSTAL CODE: V3N 4R8
COUNTRY: CANADA
213
BACK
UPDATE
CONTINUE

FIG. 5

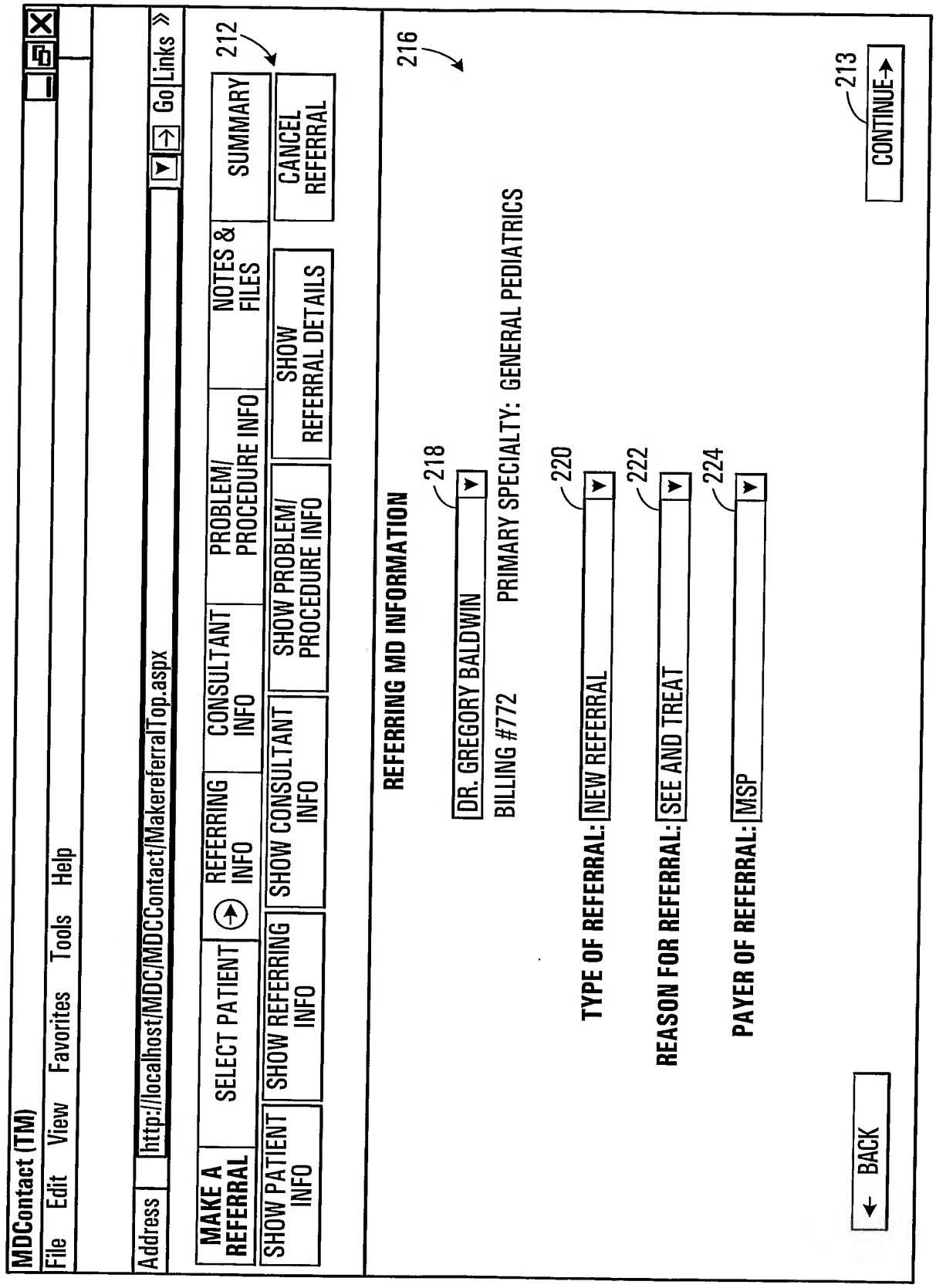
MDContact (TM)
File Edit View Favorites Tools Help
Address http://localhost/MDC/MDCContact/MakereferralTop.aspx
Go Links
MAKE A REFERRAL
SELECT PATIENT
REFERRING INFO
CONSULTANT INFO
PROBLEM/ PROCEDURE INFO
NOTES & FILES
SUMMARY
212
SHOW PATIENT INFO
SHOW REFERRING INFO
SHOW CONSULTANT INFO
SHOW PROBLEM/ PROCEDURE INFO
SHOW REFERRAL DETAILS
CANCEL REFERRAL
REFERRING MD INFORMATION
216
218
DR. GREGORY BALDWIN
BILLING #772
PRIMARY SPECIALTY: GENERAL PEDIATRICS
220
TYPE OF REFERRAL: NEW REFERRAL
222
REASON FOR REFERRAL: SEE AND TREAT
224
PAYER OF REFERRAL: MSP
213
CONTINUE
BACK

FIG. 6

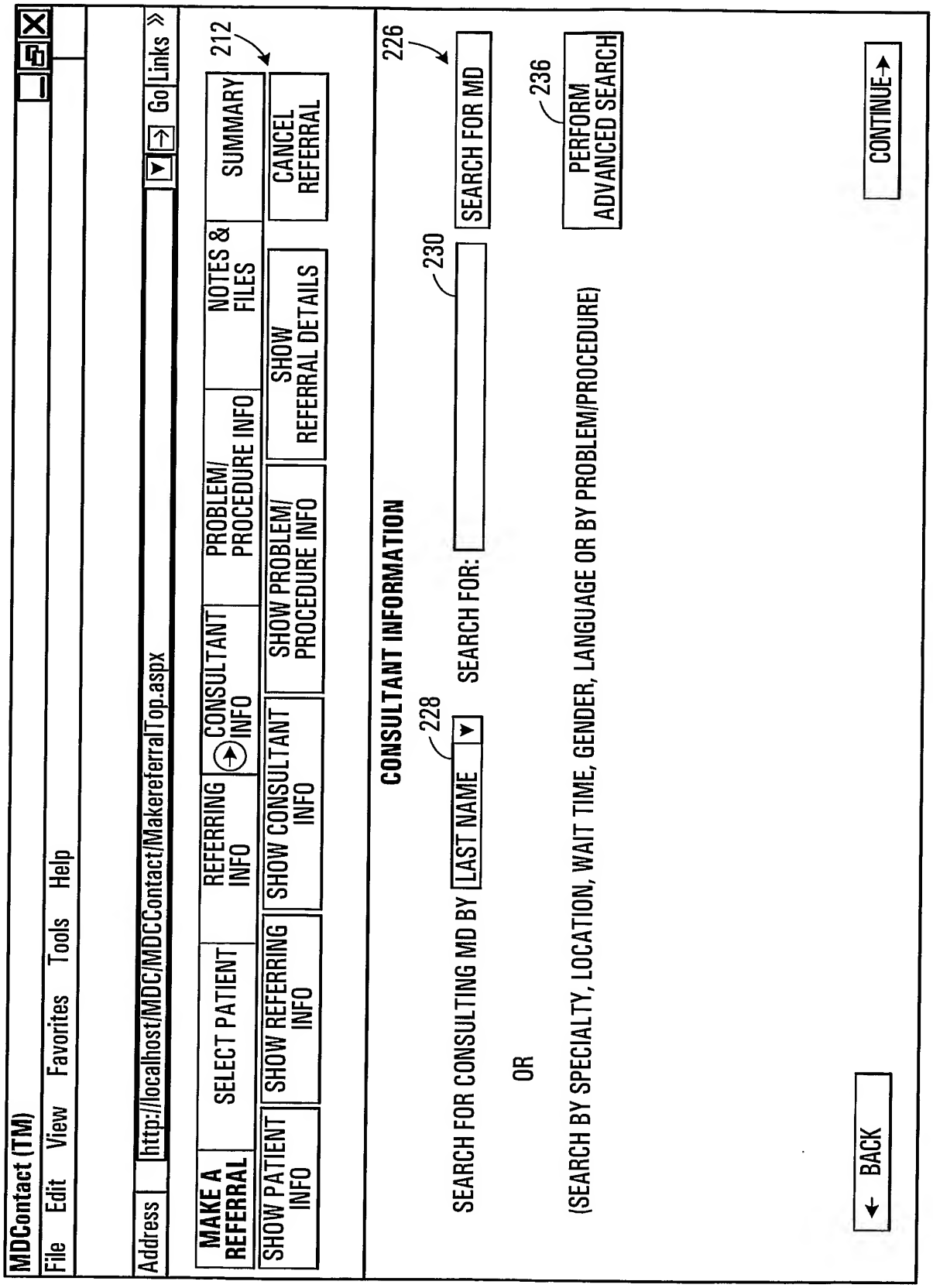
MDContact (TM)
File Edit View Favorites Tools Help
Address http://localhost/MDC/MDCContact/MakereferralTop.aspx
Go Links
MAKE A REFERRAL
SELECT PATIENT
REFERRING INFO
CONSULTANT INFO
PROBLEM/ PROCEDURE INFO
NOTES & FILES
SUMMARY
212
SHOW PATIENT INFO
SHOW REFERRING INFO
SHOW CONSULTANT INFO
SHOW PROBLEM/ PROCEDURE INFO
SHOW REFERRAL DETAILS
CANCEL REFERRAL
CONSULTANT INFORMATION
226
228
SEARCH FOR CONSULTING MD BY LAST NAME
230
SEARCH FOR:
SEARCH FOR MD
OR
236
(SEARCH BY SPECIALTY, LOCATION, WAIT TIME, GENDER, LANGUAGE OR BY PROBLEM/PROCEDURE)
PERFORM ADVANCED SEARCH
BACK
CONTINUE

FIG. 7

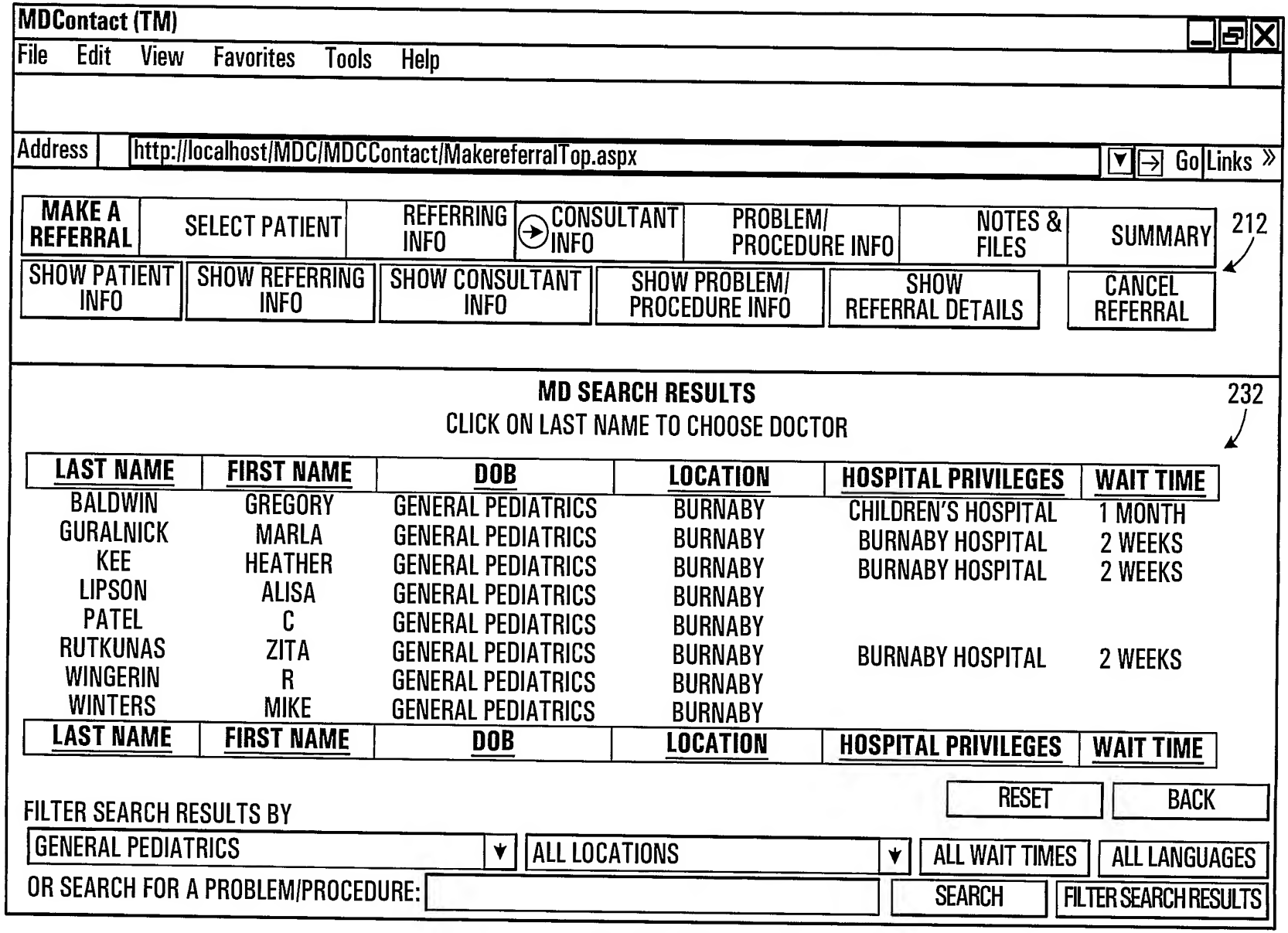
MDContact (TM)
File Edit View Favorites Tools Help
Address http://localhost/MDC/MDCContact/MakereferralTop.aspx
Go Links
MAKE A REFERRAL
SELECT PATIENT
REFERRING INFO
CONSULTANT INFO
PROBLEM/ PROCEDURE INFO
NOTES & FILES
SUMMARY
212
SHOW PATIENT INFO
SHOW REFERRING INFO
SHOW CONSULTANT INFO
SHOW PROBLEM/ PROCEDURE INFO
SHOW REFERRAL DETAILS
CANCEL REFERRAL
MD SEARCH RESULTS
232
CLICK ON LAST NAME TO CHOOSE DOCTOR
LAST NAME | FIRST NAME | DOB | LOCATION | HOSPITAL PRIVILEGES | WAIT TIME
BALDWIN | GREGORY | GENERAL PEDIATRICS | BURNABY | CHILDREN'S HOSPITAL | 1 MONTH
GURALNICK | MARLA | GENERAL PEDIATRICS | BURNABY | BURNABY HOSPITAL | 2 WEEKS
KEE | HEATHER | GENERAL PEDIATRICS | BURNABY | BURNABY HOSPITAL | 2 WEEKS
LIPSON | ALISA | GENERAL PEDIATRICS | BURNABY
PATEL | C | GENERAL PEDIATRICS | BURNABY
RUTKUNAS | ZITA | GENERAL PEDIATRICS | BURNABY | BURNABY HOSPITAL | 2 WEEKS
WINGERIN | R | GENERAL PEDIATRICS | BURNABY
WINTERS | MIKE | GENERAL PEDIATRICS | BURNABY
LAST NAME | FIRST NAME | DOB | LOCATION | HOSPITAL PRIVILEGES | WAIT TIME
RESET
BACK
FILTER SEARCH RESULTS BY
GENERAL PEDIATRICS
ALL LOCATIONS
ALL WAIT TIMES
ALL LANGUAGES
OR SEARCH FOR A PROBLEM/PROCEDURE:
SEARCH
FILTER SEARCH RESULTS

FIG. 8

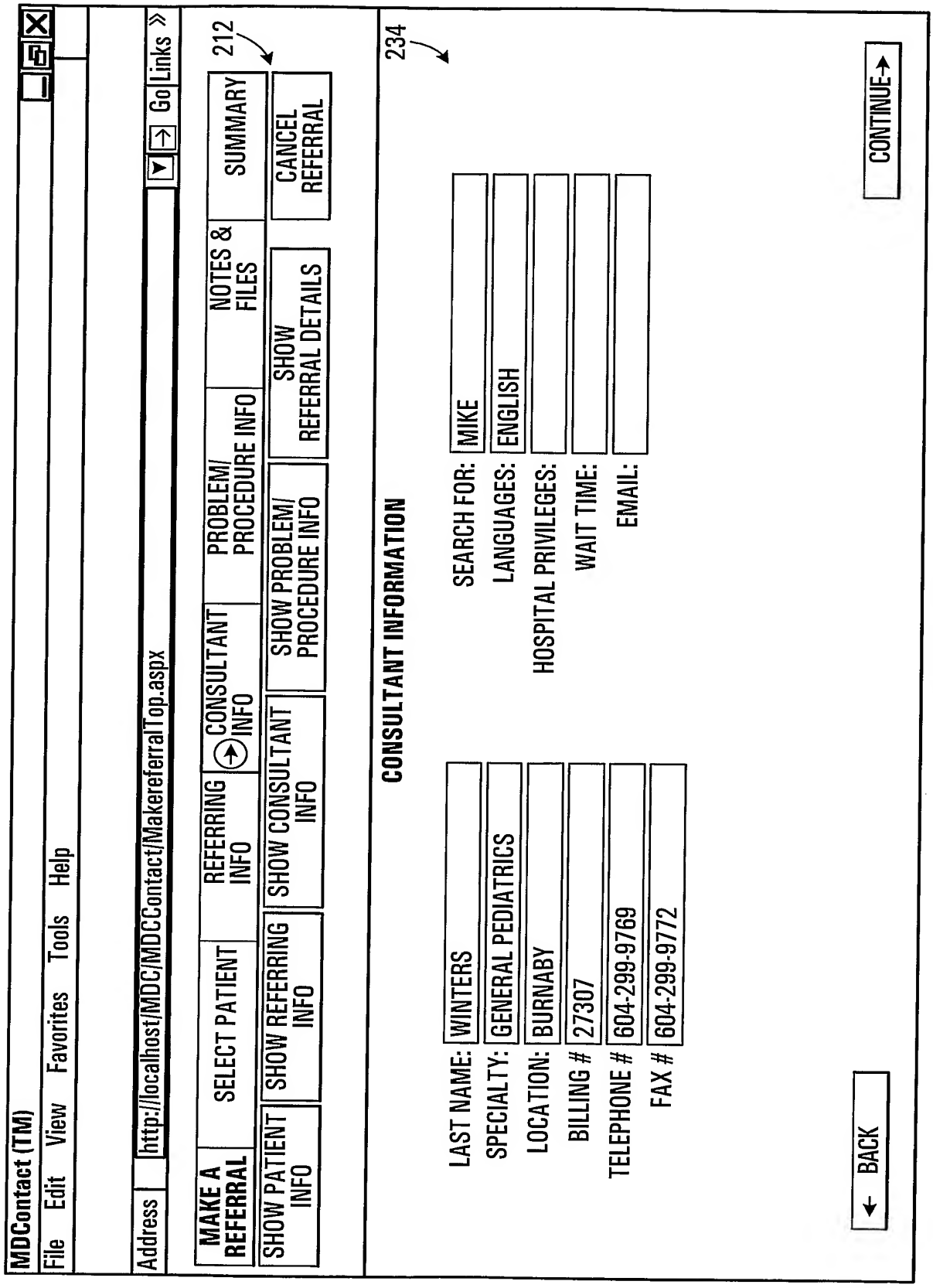
MDContact (TM)
File Edit View Favorites Tools Help
Address http://localhost/MDC/MDCContact/MakereferralTop.aspx
Go Links
MAKE A REFERRAL
SELECT PATIENT
REFERRING INFO
CONSULTANT INFO
PROBLEM/ PROCEDURE INFO
NOTES & FILES
SUMMARY
212
SHOW PATIENT INFO
SHOW REFERRING INFO
SHOW CONSULTANT INFO
SHOW PROBLEM/ PROCEDURE INFO
SHOW REFERRAL DETAILS
CANCEL REFERRAL
234
CONSULTANT INFORMATION
SEARCH FOR: MIKE
LAST NAME: WINTERS
SPECIALTY: GENERAL PEDIATRICS
LOCATION: BURNABY
BILLING # 27307
TELEPHONE # 604-299-9769
FAX # 604-299-9772
LANGUAGES: ENGLISH
HOSPITAL PRIVILEGES:
WAIT TIME:
EMAIL:
BACK
CONTINUE

FIG. 9

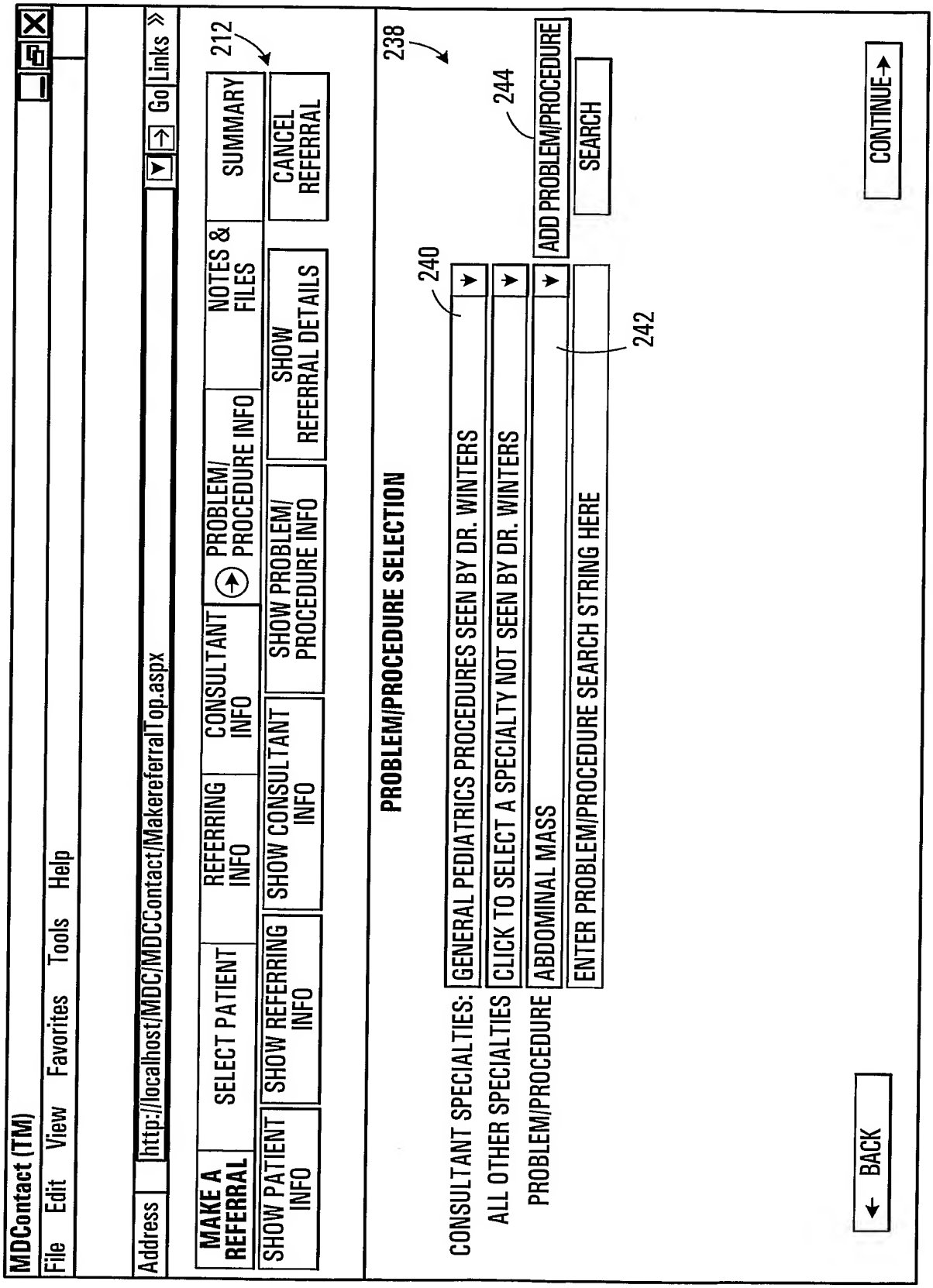
MDContact (TM)
File Edit View Favorites Tools Help
Address http://localhost/MDC/MDCContact/MakereferralTop.aspx
Go Links
MAKE A REFERRAL
SELECT PATIENT
REFERRING INFO
CONSULTANT INFO
PROBLEM/ PROCEDURE INFO
NOTES & FILES
SUMMARY
212
SHOW PATIENT INFO
SHOW REFERRING INFO
SHOW CONSULTANT INFO
SHOW PROBLEM/ PROCEDURE INFO
SHOW REFERRAL DETAILS
CANCEL REFERRAL
PROBLEM/PROCEDURE SELECTION
238
240
244
CONSULTANT SPECIALTIES:
GENERAL PEDIATRICS PROCEDURES SEEN BY DR. WINTERS
ALL OTHER SPECIALTIES
CLICK TO SELECT A SPECIALTY NOT SEEN BY DR. WINTERS
PROBLEM/PROCEDURE
ABDOMINAL MASS
ADD PROBLEM/PROCEDURE
SEARCH
242
ENTER PROBLEM/PROCEDURE SEARCH STRING HERE
BACK
CONTINUE

FIG. 10

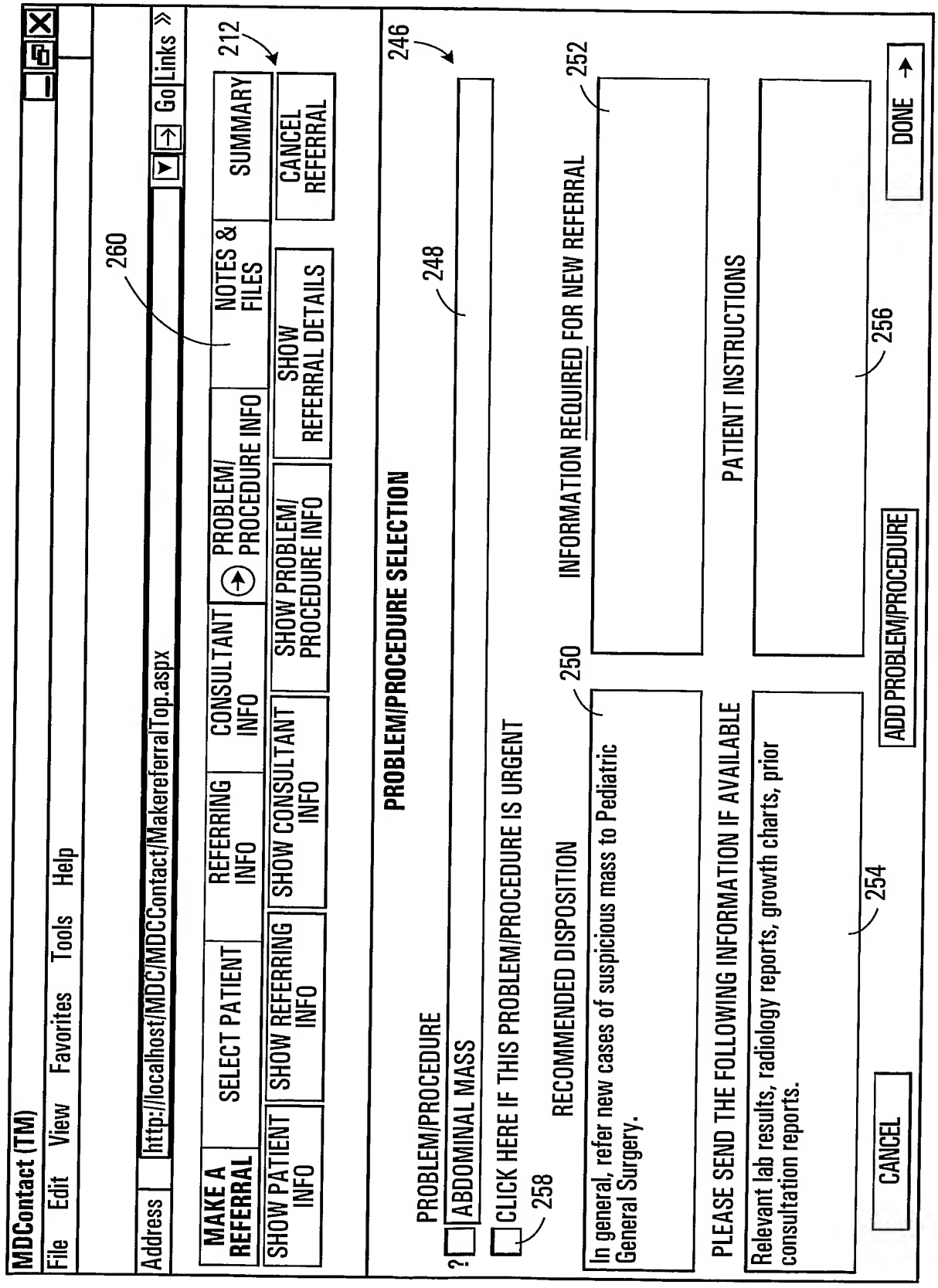
MDContact (TM)
File Edit View Favorites Tools Help
Address http://localhost/MDC/MDCContact/MakereferralTop.aspx
Go Links
260
MAKE A REFERRAL
SELECT PATIENT
REFERRING INFO
CONSULTANT INFO
PROBLEM/ PROCEDURE INFO
NOTES & FILES
SUMMARY
212
SHOW PATIENT INFO
SHOW REFERRING INFO
SHOW CONSULTANT INFO
SHOW PROBLEM/ PROCEDURE INFO
SHOW REFERRAL DETAILS
CANCEL REFERRAL
PROBLEM/PROCEDURE SELECTION
246
PROBLEM/PROCEDURE
248
ABDOMINAL MASS
CLICK HERE IF THIS PROBLEM/PROCEDURE IS URGENT
258
RECOMMENDED DISPOSITION
250
In general, refer new cases of suspicious mass to Pediatric General Surgery.
INFORMATION REQUIRED FOR NEW REFERRAL
252
PLEASE SEND THE FOLLOWING INFORMATION IF AVAILABLE
Relevant lab results, radiology reports, growth charts, prior consultation reports.
254
PATIENT INSTRUCTIONS
256
CANCEL
ADD PROBLEM/PROCEDURE
DONE

FIG. 11

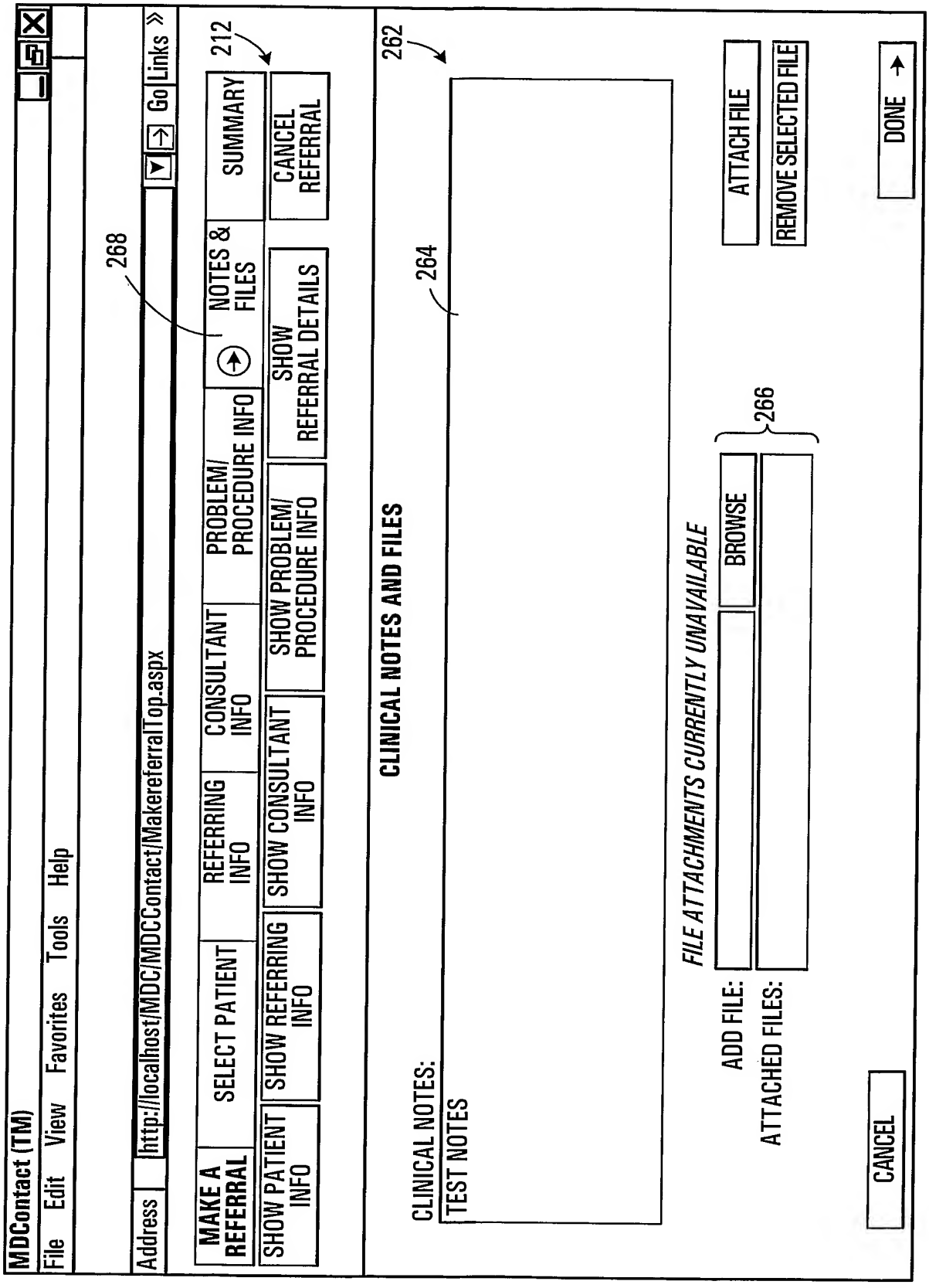
MDContact (TM)
File Edit View Favorites Tools Help
Address http://localhost/MDC/MDCContact/MakereferralTop.aspx
Go Links
MAKE A REFERRAL
SELECT PATIENT
REFERRING INFO
CONSULTANT INFO
PROBLEM/ PROCEDURE INFO
NOTES & FILES
SUMMARY
CANCEL REFERRAL
SHOW PATIENT INFO
SHOW REFERRING INFO
SHOW CONSULTANT INFO
SHOW PROBLEM/ PROCEDURE INFO
SHOW REFERRAL DETAILS
CLINICAL NOTES AND FILES
CLINICAL NOTES:
TEST NOTES
FILE ATTACHMENTS CURRENTLY UNAVAILABLE
ADD FILE:
BROWSE
ATTACH FILE
ATTACHED FILES:
REMOVE SELECTED FILE
CANCEL
DONE
212
262
264
266
268

FIG. 12

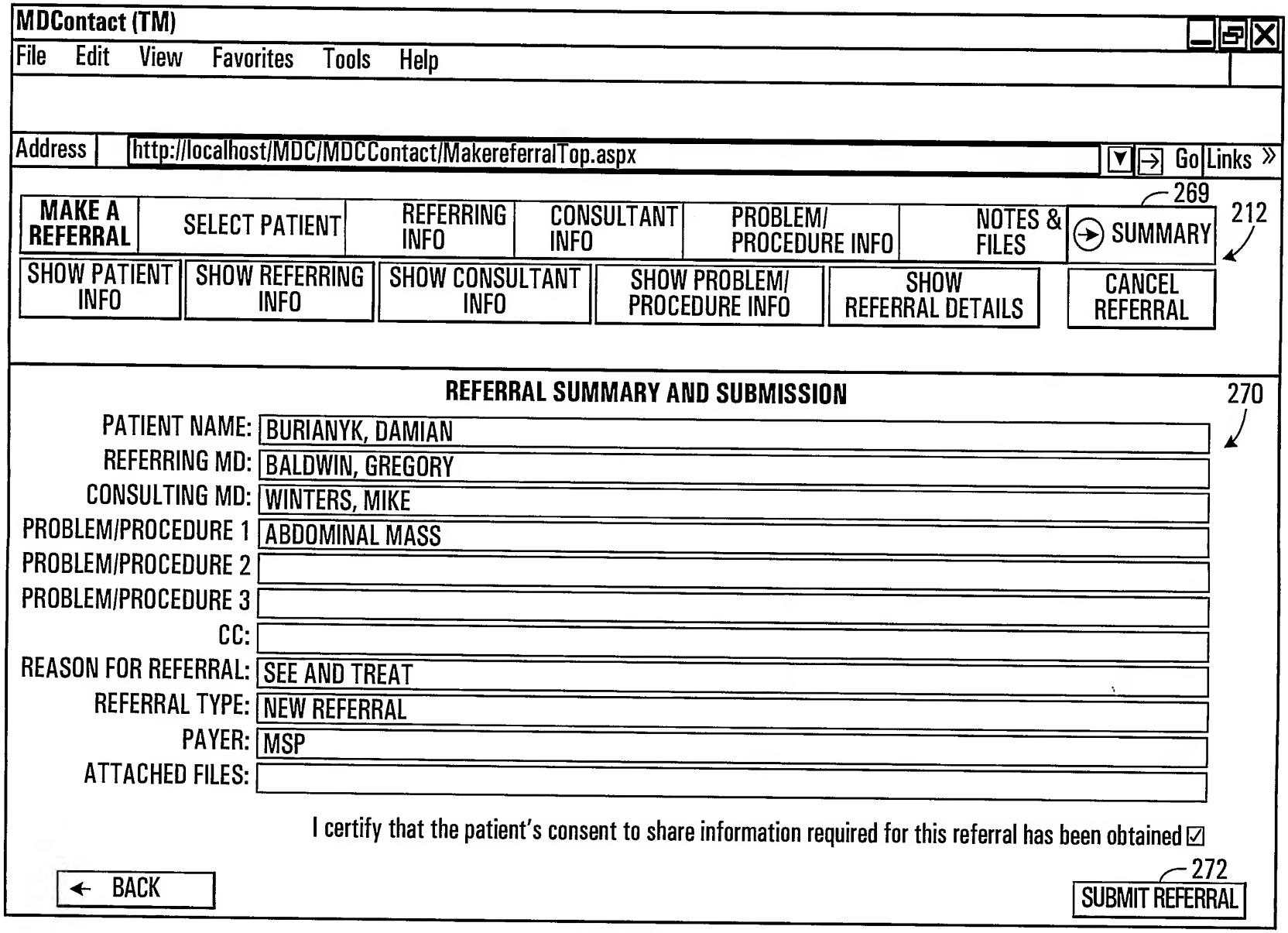
MDContact (TM)
File Edit View Favorites Tools Help
Address http://localhost/MDC/MDCContact/MakereferralTop.aspx
Go Links
MAKE A REFERRAL
SELECT PATIENT
REFERRING INFO
CONSULTANT INFO
PROBLEM/ PROCEDURE INFO
NOTES & FILES
SUMMARY
269
212
SHOW PATIENT INFO
SHOW REFERRING INFO
SHOW CONSULTANT INFO
SHOW PROBLEM/ PROCEDURE INFO
SHOW REFERRAL DETAILS
CANCEL REFERRAL
REFERRAL SUMMARY AND SUBMISSION
270
PATIENT NAME: BURIANYK, DAMIAN
REFERRING MD: BALDWIN, GREGORY
CONSULTING MD: WINTERS, MIKE
PROBLEM/PROCEDURE 1 ABDOMINAL MASS
PROBLEM/PROCEDURE 2
PROBLEM/PROCEDURE 3
CC:
REASON FOR REFERRAL: SEE AND TREAT
REFERRAL TYPE: NEW REFERRAL
PAYER: MSP
ATTACHED FILES:
I certify that the patient's consent to share information required for this referral has been obtained ☑
BACK
272
SUBMIT REFERRAL

FIG. 13

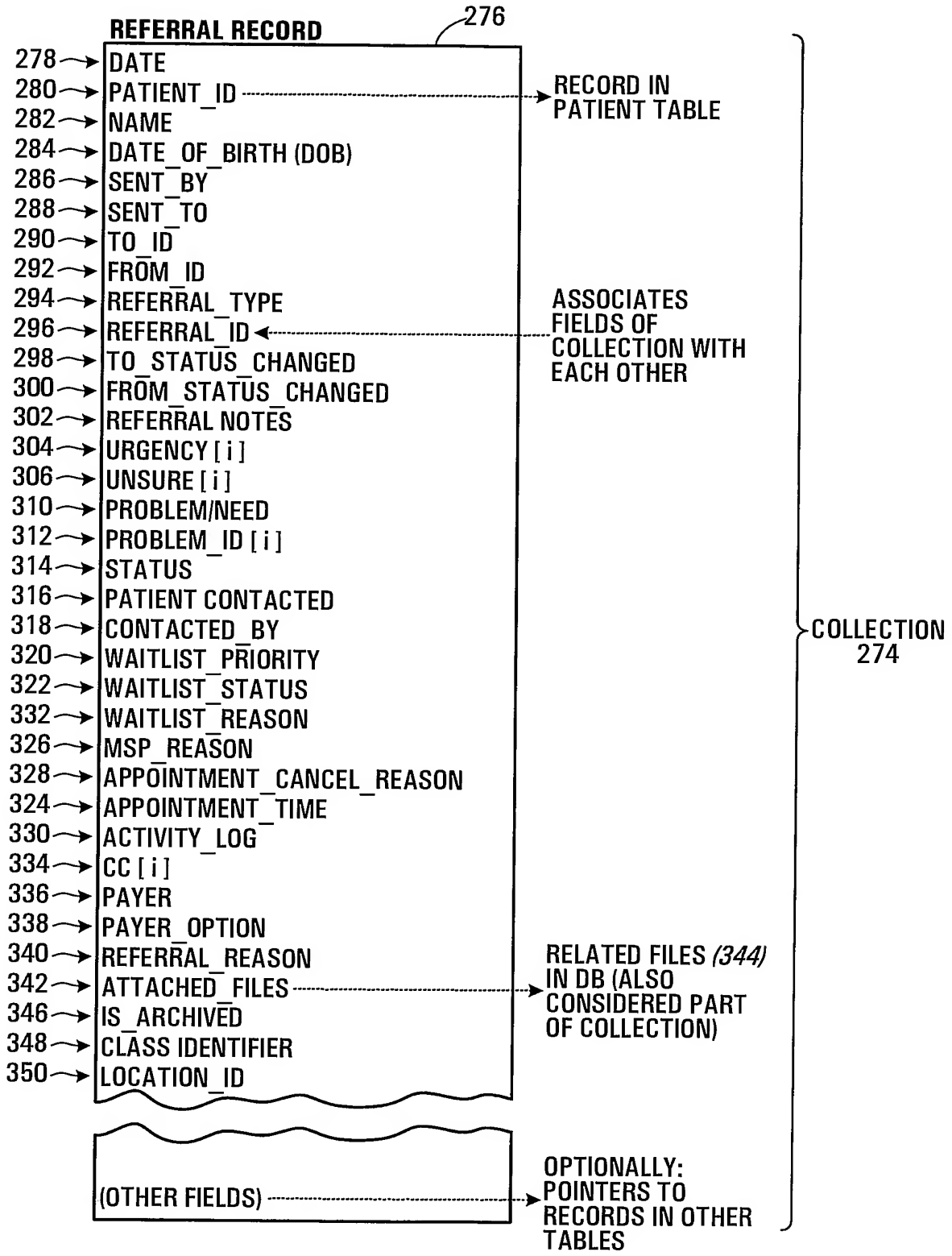
REFERRAL RECORD
276
278 DATE
280 PATIENT_ID
282 NAME
284 DATE_OF_BIRTH (DOB)
286 SENT_BY
288 SENT_TO
290 TO_ID
292 FROM_ID
294 REFERRAL_TYPE
296 REFERRAL_ID
298 TO_STATUS_CHANGED
300 FROM_STATUS_CHANGED
302 REFERRAL NOTES
304 URGENCY [i]
306 UNSURE [i]
310 PROBLEM/NEED
312 PROBLEM_ID [i]
314 STATUS
316 PATIENT CONTACTED
318 CONTACTED_BY
320 WAITLIST_PRIORITY
322 WAITLIST_STATUS
332 WAITLIST_REASON
326 MSP_REASON
328 APPOINTMENT_CANCEL_REASON
324 APPOINTMENT_TIME
330 ACTIVITY_LOG
334 CC [i]
336 PAYER
338 PAYER_OPTION
340 REFERRAL_REASON
342 ATTACHED_FILES
346 IS_ARCHIVED
348 CLASS IDENTIFIER
350 LOCATION_ID
(OTHER FIELDS)
RECORD IN PATIENT TABLE
ASSOCIATES FIELDS OF COLLECTION WITH EACH OTHER
RELATED FILES (344) IN DB (ALSO CONSIDERED PART OF COLLECTION)
OPTIONALLY: POINTERS TO RECORDS IN OTHER TABLES
COLLECTION 274

FIG. 14

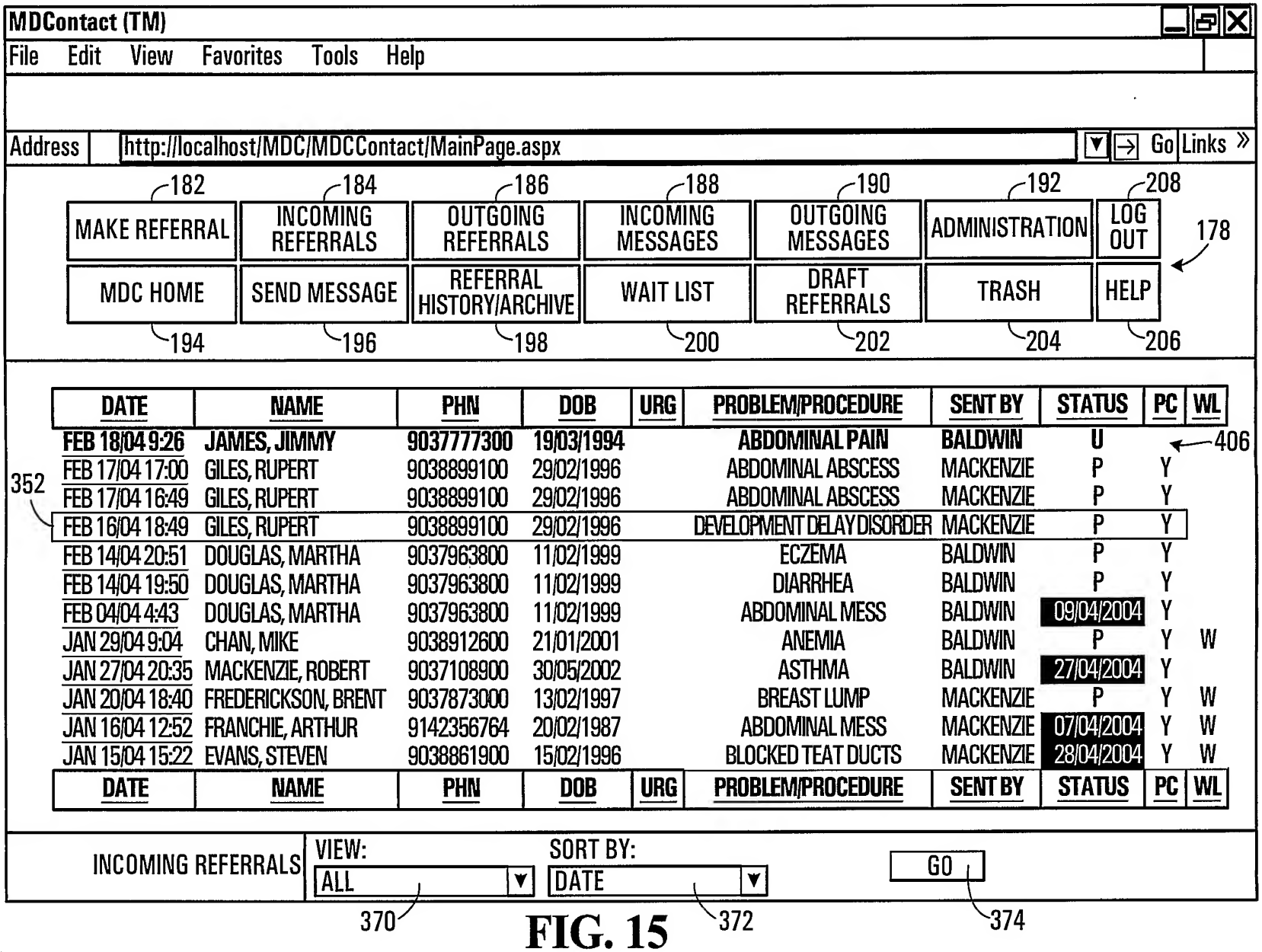
MDContact (TM)
File Edit View Favorites Tools Help
368
Address http://localhost/MDC/MDCContact/MainPage.aspx Go Links »
182 MAKE REFERRAL
184 INCOMING REFERRALS
186 OUTGOING REFERRALS
188 INCOMING MESSAGES
190 OUTGOING MESSAGES
192 ADMINISTRATION
208 LOG OUT
178
MDC HOME
SEND MESSAGE
REFERRAL HISTORY/ARCHIVE
WAIT LIST
DRAFT REFERRALS
TRASH
HELP
194 196 198 200 202 204 206
352
406
DATE NAME PHN DOB URG PROBLEM/PROCEDURE SENT BY STATUS PC WL
FEB 18/04 9:26 JAMES, JIMMY 9037777300 19/03/1994 ABDOMINAL PAIN BALDWIN U
FEB 17/04 17:00 GILES, RUPERT 9038899100 29/02/1996 ABDOMINAL ABSCESS MACKENZIE P Y
FEB 17/04 16:49 GILES, RUPERT 9038899100 29/02/1996 ABDOMINAL ABSCESS MACKENZIE P Y
FEB 16/04 18:49 GILES, RUPERT 9038899100 29/02/1996 DEVELOPMENT DELAY DISORDER MACKENZIE P Y
FEB 14/04 20:51 DOUGLAS, MARTHA 9037963800 11/02/1999 ECZEMA BALDWIN P Y
FEB 14/04 19:50 DOUGLAS, MARTHA 9037963800 11/02/1999 DIARRHEA BALDWIN P Y
FEB 04/04 4:43 DOUGLAS, MARTHA 9037963800 11/02/1999 ABDOMINAL MESS BALDWIN 09/04/2004 Y
JAN 29/04 9:04 CHAN, MIKE 9038912600 21/01/2001 ANEMIA BALDWIN P Y W
JAN 27/04 20:35 MACKENZIE, ROBERT 9037108900 30/05/2002 ASTHMA BALDWIN 27/04/2004 Y
JAN 20/04 18:40 FREDERICKSON, BRENT 9037873000 13/02/1997 BREAST LUMP MACKENZIE P Y W
JAN 16/04 12:52 FRANCHIE, ARTHUR 9142356764 20/02/1987 ABDOMINAL MESS MACKENZIE 07/04/2004 Y W
JAN 15/04 15:22 EVANS, STEVEN 9038861900 15/02/1996 BLOCKED TEAT DUCTS MACKENZIE 28/04/2004 Y W
DATE NAME PHN DOB URG PROBLEM/PROCEDURE SENT BY STATUS PC WL
INCOMING REFERRALS
VIEW: ALL
SORT BY: DATE
GO
370 372 374

FIG. 15

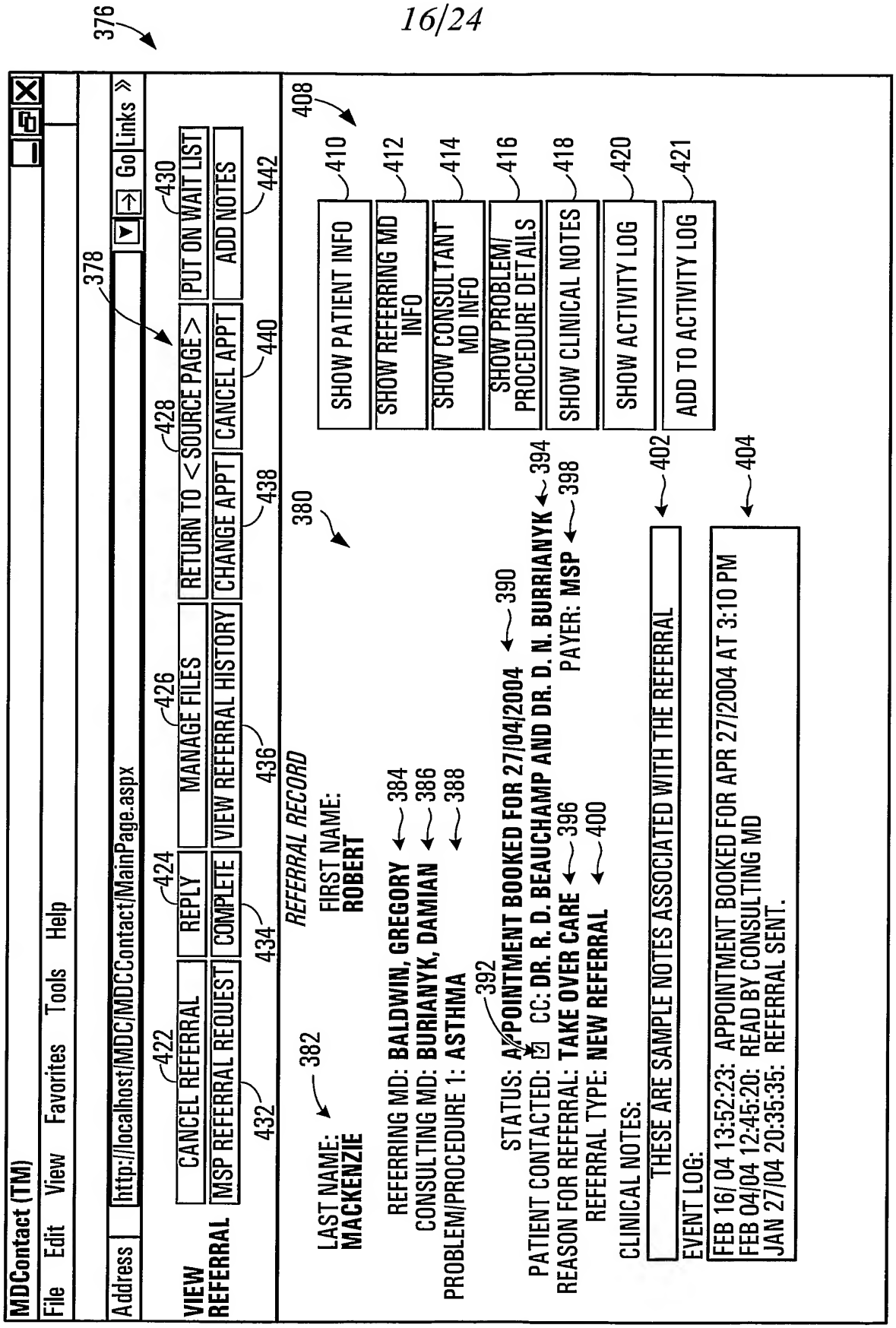
376
MDContact (TM)
File Edit View Favorites Tools Help
Address http://localhost/MDC/MDContact/MainPage.aspx
378
Go Links
VIEW REFERRAL
CANCEL REFERRAL
MSP REFERRAL REQUEST
REPLY
COMPLETE
MANAGE FILES
VIEW REFERRAL HISTORY
RETURN TO < SOURCE PAGE >
CHANGE APPT
PUT ON WAIT LIST
CANCEL APPT
ADD NOTES
422
424
426
428
430
432
434
436
438
440
442
REFERRAL RECORD
380
408
LAST NAME: MACKENZIE
382
FIRST NAME: ROBERT
REFERRING MD: BALDWIN, GREGORY
384
CONSULTING MD: BURIANYK, DAMIAN
386
PROBLEM/PROCEDURE 1: ASTHMA
388
STATUS: APPOINTMENT BOOKED FOR 27/04/2004
390
392
PATIENT CONTACTED: CC: DR. R. D. BEAUCHAMP AND DR. D. N. BURRIANYK
394
REASON FOR REFERRAL: TAKE OVER CARE
396
PAYER: MSP
398
REFERRAL TYPE: NEW REFERRAL
400
CLINICAL NOTES:
THESE ARE SAMPLE NOTES ASSOCIATED WITH THE REFERRAL
402
EVENT LOG:
FEB 16/ 04 13:52:23: APPOINTMENT BOOKED FOR APR 27/2004 AT 3:10 PM
FEB 04/04 12:45:20: READ BY CONSULTING MD
JAN 27/04 20:35:35: REFERRAL SENT.
404
SHOW PATIENT INFO
410
SHOW REFERRING MD INFO
412
SHOW CONSULTANT MD INFO
414
SHOW PROBLEM/ PROCEDURE DETAILS
416
SHOW CLINICAL NOTES
418
SHOW ACTIVITY LOG
420
ADD TO ACTIVITY LOG
421

FIG. 16

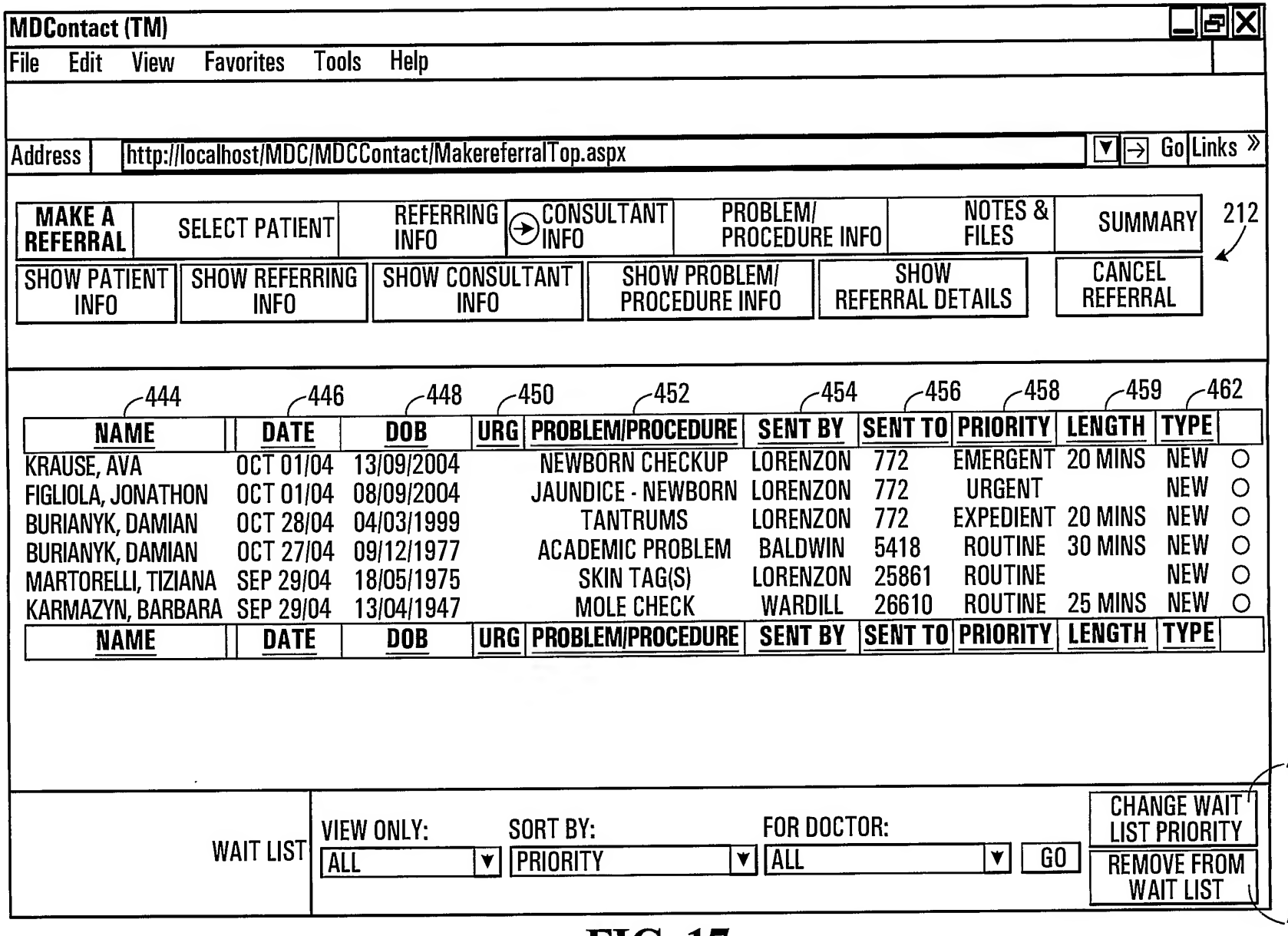
MDContact (TM)
File Edit View Favorites Tools Help
Address http://localhost/MDC/MDCContact/MakereferralTop.aspx
Go Links
MAKE A REFERRAL
SELECT PATIENT
REFERRING INFO
CONSULTANT INFO
PROBLEM/ PROCEDURE INFO
NOTES & FILES
SUMMARY
212
SHOW PATIENT INFO
SHOW REFERRING INFO
SHOW CONSULTANT INFO
SHOW PROBLEM/ PROCEDURE INFO
SHOW REFERRAL DETAILS
CANCEL REFERRAL
444 446 448 450 452 454 456 458 459 462
NAME DATE DOB URG PROBLEM/PROCEDURE SENT BY SENT TO PRIORITY LENGTH TYPE
KRAUSE, AVA OCT 01/04 13/09/2004 NEWBORN CHECKUP LORENZON 772 EMERGENT 20 MINS NEW
FIGLIOLA, JONATHON OCT 01/04 08/09/2004 JAUNDICE - NEWBORN LORENZON 772 URGENT NEW
BURIANYK, DAMIAN OCT 28/04 04/03/1999 TANTRUMS LORENZON 772 EXPEDIENT 20 MINS NEW
BURIANYK, DAMIAN OCT 27/04 09/12/1977 ACADEMIC PROBLEM BALDWIN 5418 ROUTINE 30 MINS NEW
MARTORELLI, TIZIANA SEP 29/04 18/05/1975 SKIN TAG(S) LORENZON 25861 ROUTINE NEW
KARMAZYN, BARBARA SEP 29/04 13/04/1947 MOLE CHECK WARDILL 26610 ROUTINE 25 MINS NEW
NAME DATE DOB URG PROBLEM/PROCEDURE SENT BY SENT TO PRIORITY LENGTH TYPE
461
WAIT LIST
VIEW ONLY: ALL
SORT BY: PRIORITY
FOR DOCTOR: ALL
GO
CHANGE WAIT LIST PRIORITY
REMOVE FROM WAIT LIST
460

FIG. 17

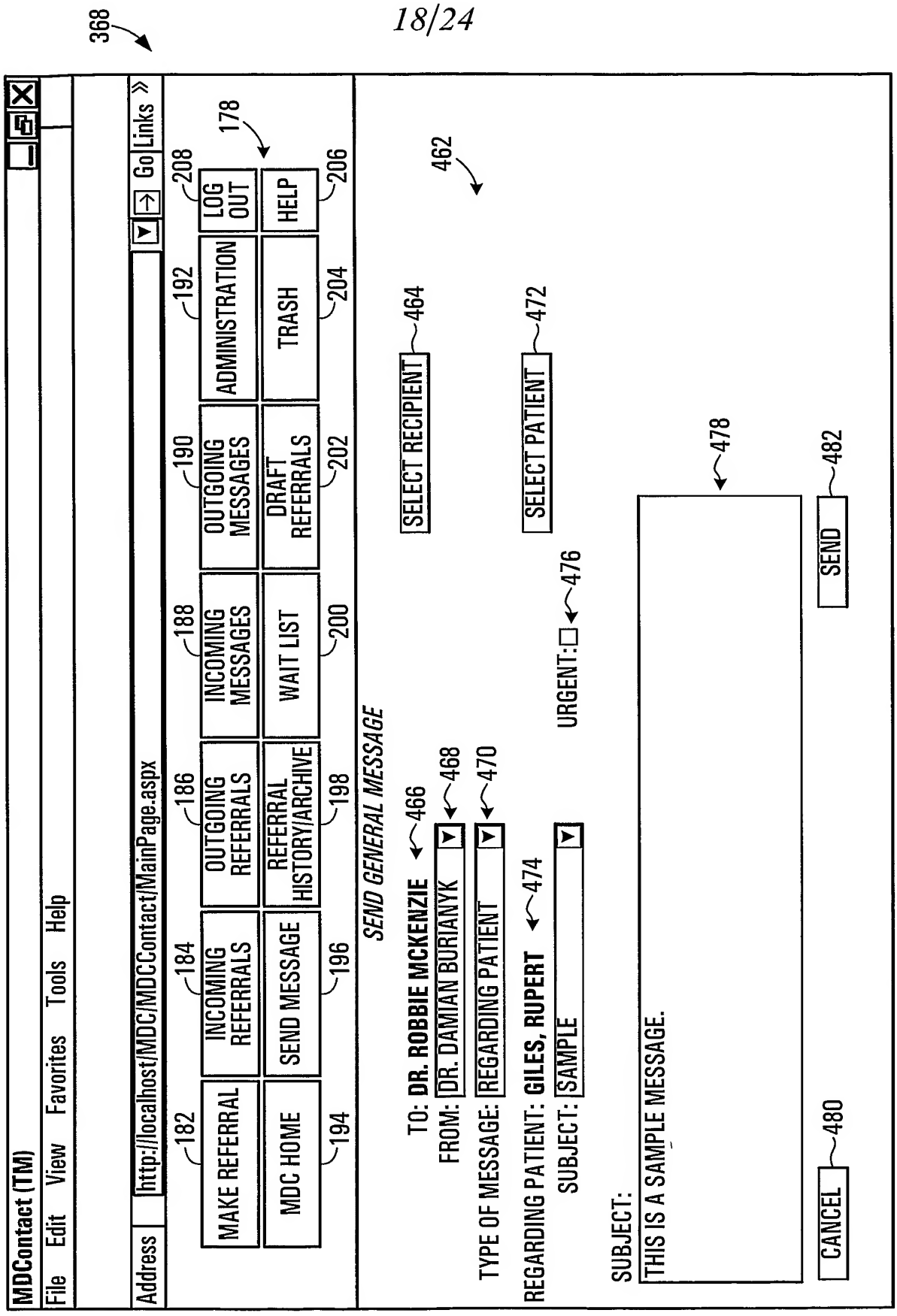
368
MDContact (TM)
File Edit View Favorites Tools Help
Address http://localhost/MDC/MDCContact/MainPage.aspx
Go Links
MAKE REFERRAL
INCOMING REFERRALS
OUTGOING REFERRALS
INCOMING MESSAGES
OUTGOING MESSAGES
ADMINISTRATION
LOG OUT
MDC HOME
SEND MESSAGE
REFERRAL HISTORY/ARCHIVE
WAIT LIST
DRAFT REFERRALS
TRASH
HELP
182
184
186
188
190
192
208
178
194
196
198
200
202
204
206
SEND GENERAL MESSAGE
462
TO: DR. ROBBIE MCKENZIE
466
SELECT RECIPIENT
464
FROM: DR. DAMIAN BURIANYK
468
TYPE OF MESSAGE: REGARDING PATIENT
470
SELECT PATIENT
472
REGARDING PATIENT: GILES, RUPERT
474
URGENT:
476
SUBJECT: SAMPLE
SUBJECT:
THIS IS A SAMPLE MESSAGE.
478
CANCEL
480
SEND
482

FIG. 18

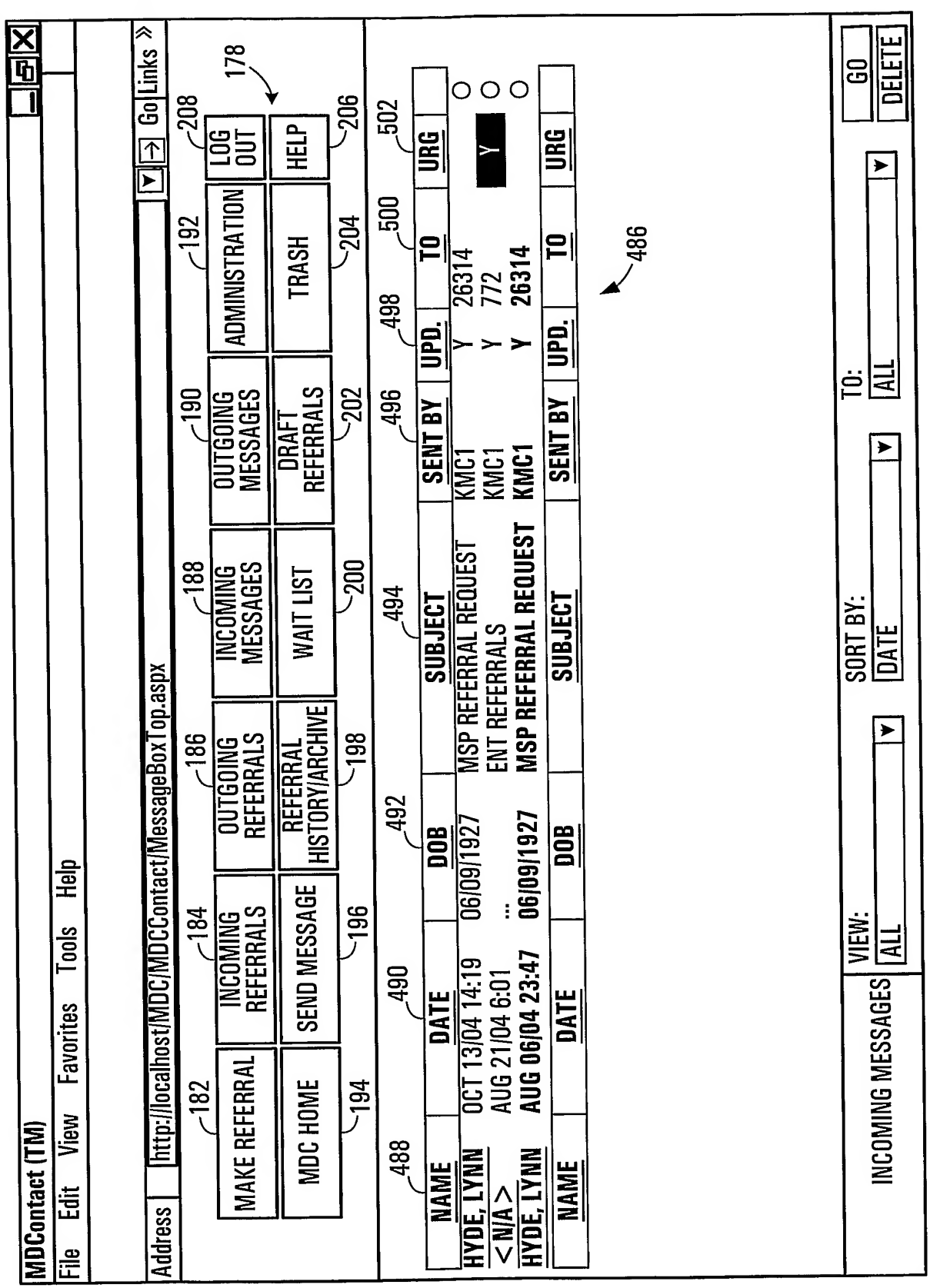
484
MDContact (TM)
File Edit View Favorites Tools Help
Address http://localhost/MDC/MDCContact/MessageBoxTop.aspx
Go Links
182 MAKE REFERRAL
184 INCOMING REFERRALS
186 OUTGOING REFERRALS
188 INCOMING MESSAGES
190 OUTGOING MESSAGES
192 ADMINISTRATION
208 LOG OUT
178
194 MDC HOME
196 SEND MESSAGE
198 REFERRAL HISTORY/ARCHIVE
200 WAIT LIST
202 DRAFT REFERRALS
204 TRASH
206 HELP
488 NAME
490 DATE
492 DOB
494 SUBJECT
496 SENT BY
498 UPD.
500 TO
502 URG
HYDE, LYNN OCT 13/04 14:19 06/09/1927 MSP REFERRAL REQUEST KMC1 Y 26314
<N/A> AUG 21/04 6:01 ... ENT REFERRALS KMC1 Y 772
HYDE, LYNN AUG 06/04 23:47 06/09/1927 MSP REFERRAL REQUEST KMC1 Y 26314
NAME DATE DOB SUBJECT SENT BY UPD. TO URG
486
INCOMING MESSAGES
VIEW: ALL
SORT BY: DATE
TO: ALL
GO
DELETE

FIG. 19

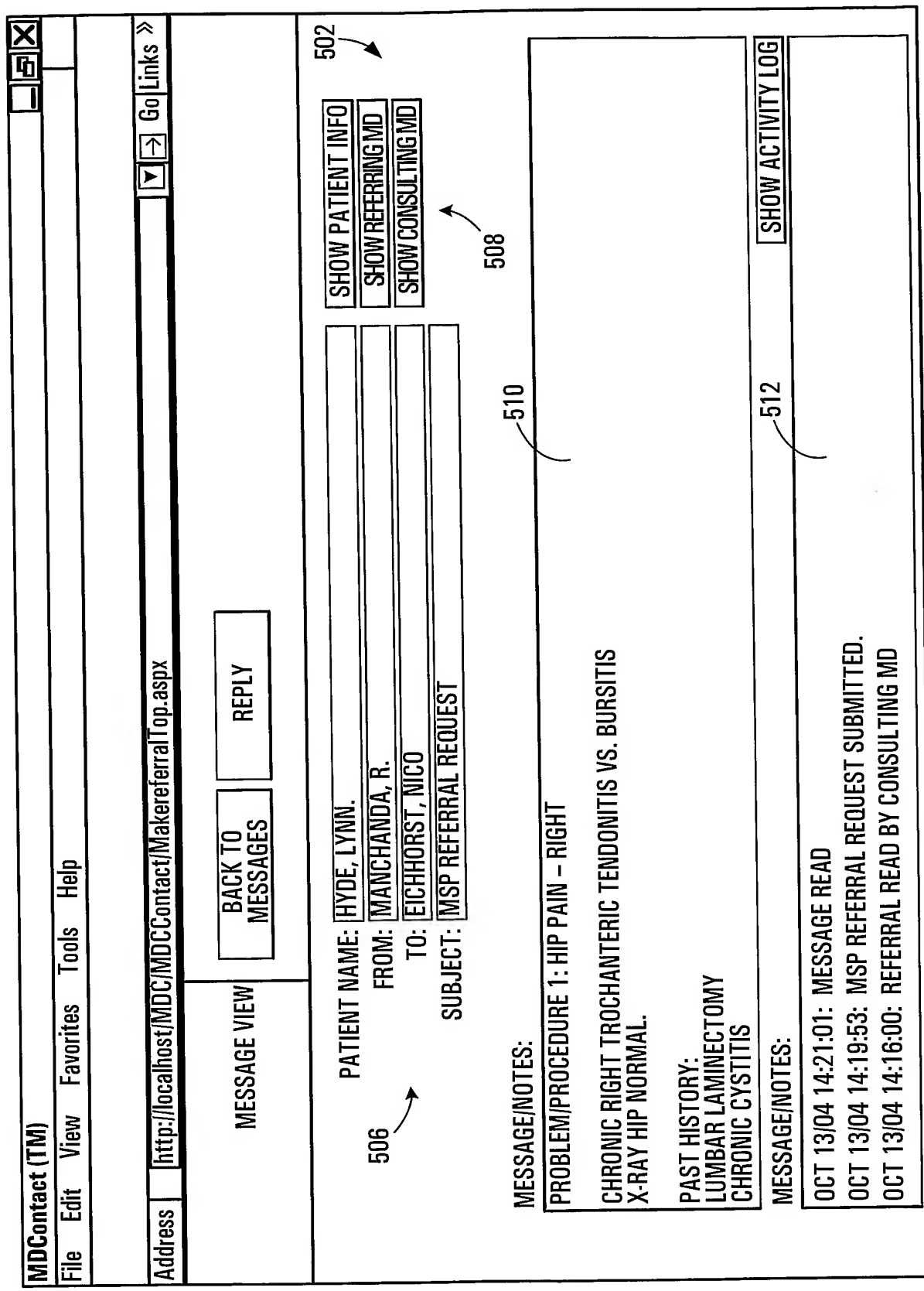
MDContact (TM)
File Edit View Favorites Tools Help
Address http://localhost/MDC/MDCContact/MakereferralTop.aspx
Go Links
MESSAGE VIEW
BACK TO MESSAGES
REPLY
502
SHOW PATIENT INFO
SHOW REFERRING MD
SHOW CONSULTING MD
508
506
PATIENT NAME: HYDE, LYNN.
FROM: MANCHANDA, R.
TO: EICHHORST, NICO
SUBJECT: MSP REFERRAL REQUEST
510
MESSAGE/NOTES:
PROBLEM/PROCEDURE 1: HIP PAIN – RIGHT
CHRONIC RIGHT TROCHANTERIC TENDONITIS VS. BURSITIS
X-RAY HIP NORMAL.
PAST HISTORY:
LUMBAR LAMINECTOMY
CHRONIC CYSTITIS
512
SHOW ACTIVITY LOG
MESSAGE/NOTES:
OCT 13/04 14:21:01: MESSAGE READ
OCT 13/04 14:19:53: MSP REFERRAL REQUEST SUBMITTED.
OCT 13/04 14:16:00: REFERRAL READ BY CONSULTING MD

FIG. 20

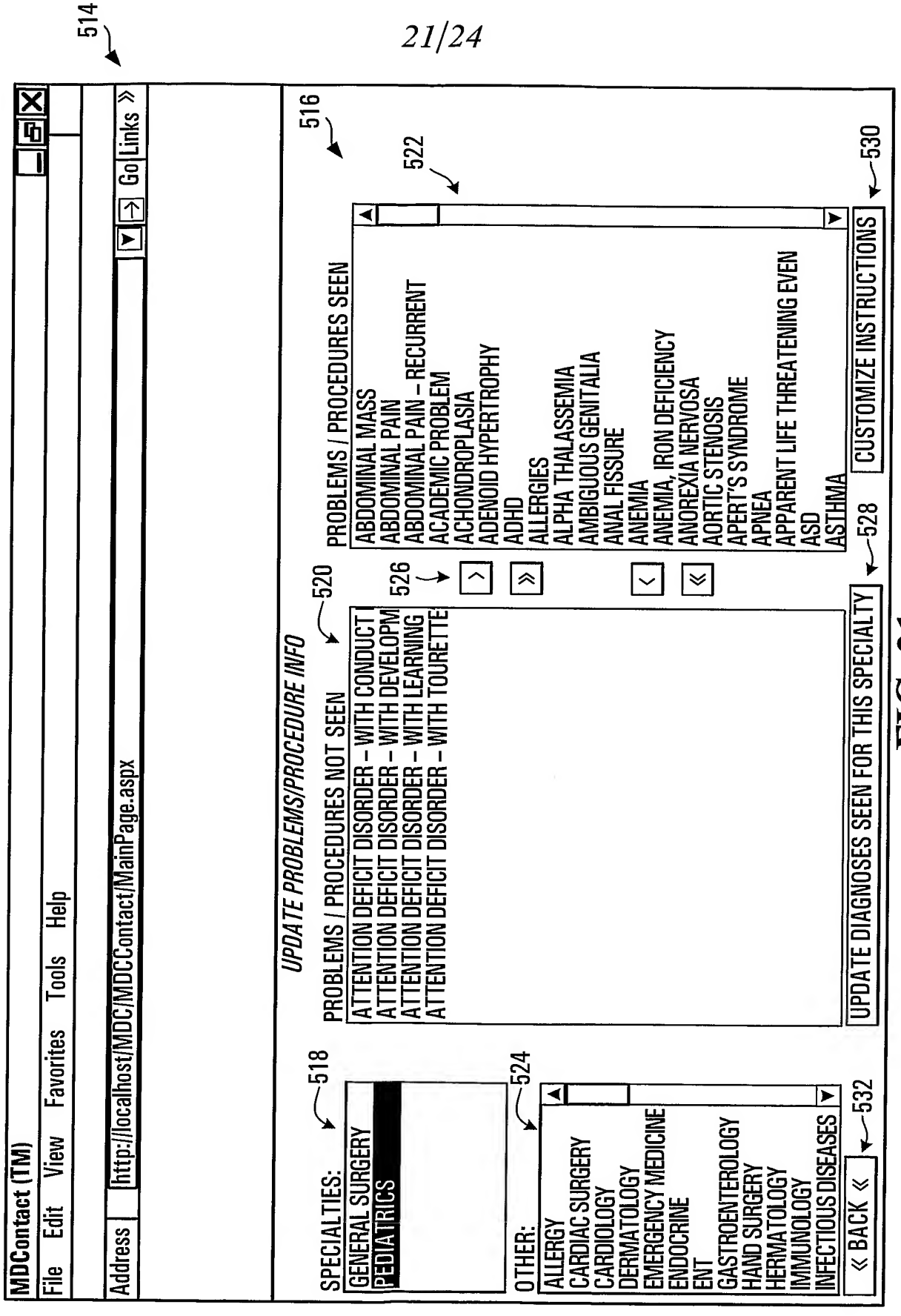
514
MDContact (TM)
File Edit View Favorites Tools Help
Address http://localhost/MDC/MDCContact/MainPage.aspx
Go Links
UPDATE PROBLEMS/PROCEDURE INFO
516
522
PROBLEMS / PROCEDURES SEEN
ABDOMINAL MASS
ABDOMINAL PAIN
ABDOMINAL PAIN – RECURRENT
ACADEMIC PROBLEM
ACHONDROPLASIA
ADENOID HYPERTROPHY
ADHD
ALLERGIES
ALPHA THALASSEMIA
AMBIGUOUS GENITALIA
ANAL FISSURE
ANEMIA
ANEMIA, IRON DEFICIENCY
ANOREXIA NERVOSA
AORTIC STENOSIS
APERT'S SYNDROME
APNEA
APPARENT LIFE THREATENING EVEN
ASD
ASTHMA
520
PROBLEMS / PROCEDURES NOT SEEN
ATTENTION DEFICIT DISORDER – WITH CONDUCT
ATTENTION DEFICIT DISORDER – WITH DEVELOPM
ATTENTION DEFICIT DISORDER – WITH LEARNING
ATTENTION DEFICIT DISORDER – WITH TOURETTE
526
>
»
<
«
528
UPDATE DIAGNOSES SEEN FOR THIS SPECIALTY
530
CUSTOMIZE INSTRUCTIONS
518
SPECIALTIES:
GENERAL SURGERY
PEDIATRICS
524
OTHER:
ALLERGY
CARDIAC SURGERY
CARDIOLOGY
DERMATOLOGY
EMERGENCY MEDICINE
ENDOCRINE
ENT
GASTROENTEROLOGY
HAND SURGERY
HERMATOLOGY
IMMUNOLOGY
INFECTIOUS DISEASES
« BACK «
532

FIG. 21

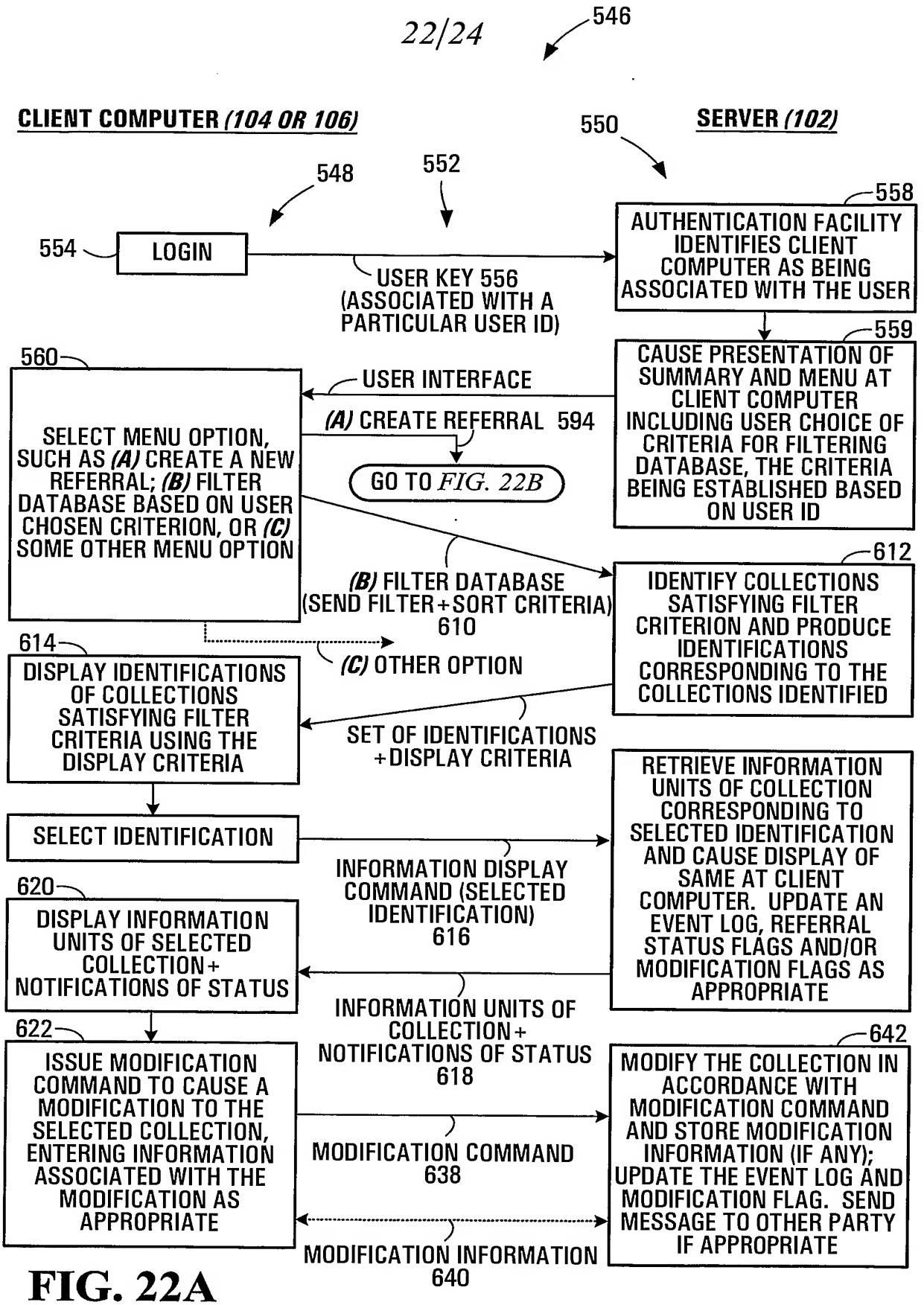
546
CLIENT COMPUTER (104 OR 106)
550
SERVER (102)
548
552
554
LOGIN
USER KEY 556 (ASSOCIATED WITH A PARTICULAR USER ID)
558
AUTHENTICATION FACILITY IDENTIFIES CLIENT COMPUTER AS BEING ASSOCIATED WITH THE USER
559
CAUSE PRESENTATION OF SUMMARY AND MENU AT CLIENT COMPUTER INCLUDING USER CHOICE OF CRITERIA FOR FILTERING DATABASE, THE CRITERIA BEING ESTABLISHED BASED ON USER ID
560
USER INTERFACE
(A) CREATE REFERRAL 594
GO TO FIG. 22B
SELECT MENU OPTION, SUCH AS (A) CREATE A NEW REFERRAL; (B) FILTER DATABASE BASED ON USER CHOSEN CRITERION, OR (C) SOME OTHER MENU OPTION
(B) FILTER DATABASE (SEND FILTER+SORT CRITERIA) 610
612
IDENTIFY COLLECTIONS SATISFYING FILTER CRITERION AND PRODUCE IDENTIFICATIONS CORRESPONDING TO THE COLLECTIONS IDENTIFIED
(C) OTHER OPTION
614
DISPLAY IDENTIFICATIONS OF COLLECTIONS SATISFYING FILTER CRITERIA USING THE DISPLAY CRITERIA
SET OF IDENTIFICATIONS +DISPLAY CRITERIA
SELECT IDENTIFICATION
INFORMATION DISPLAY COMMAND (SELECTED IDENTIFICATION) 616
RETRIEVE INFORMATION UNITS OF COLLECTION CORRESPONDING TO SELECTED IDENTIFICATION AND CAUSE DISPLAY OF SAME AT CLIENT COMPUTER. UPDATE AN EVENT LOG, REFERRAL STATUS FLAGS AND/OR MODIFICATION FLAGS AS APPROPRIATE
620
DISPLAY INFORMATION UNITS OF SELECTED COLLECTION+ NOTIFICATIONS OF STATUS
INFORMATION UNITS OF COLLECTION+ NOTIFICATIONS OF STATUS 618
622
ISSUE MODIFICATION COMMAND TO CAUSE A MODIFICATION TO THE SELECTED COLLECTION, ENTERING INFORMATION ASSOCIATED WITH THE MODIFICATION AS APPROPRIATE
642
MODIFY THE COLLECTION IN ACCORDANCE WITH MODIFICATION COMMAND AND STORE MODIFICATION INFORMATION (IF ANY); UPDATE THE EVENT LOG AND MODIFICATION FLAG. SEND MESSAGE TO OTHER PARTY IF APPROPRIATE
MODIFICATION COMMAND 638
MODIFICATION INFORMATION 640

FIG. 22A

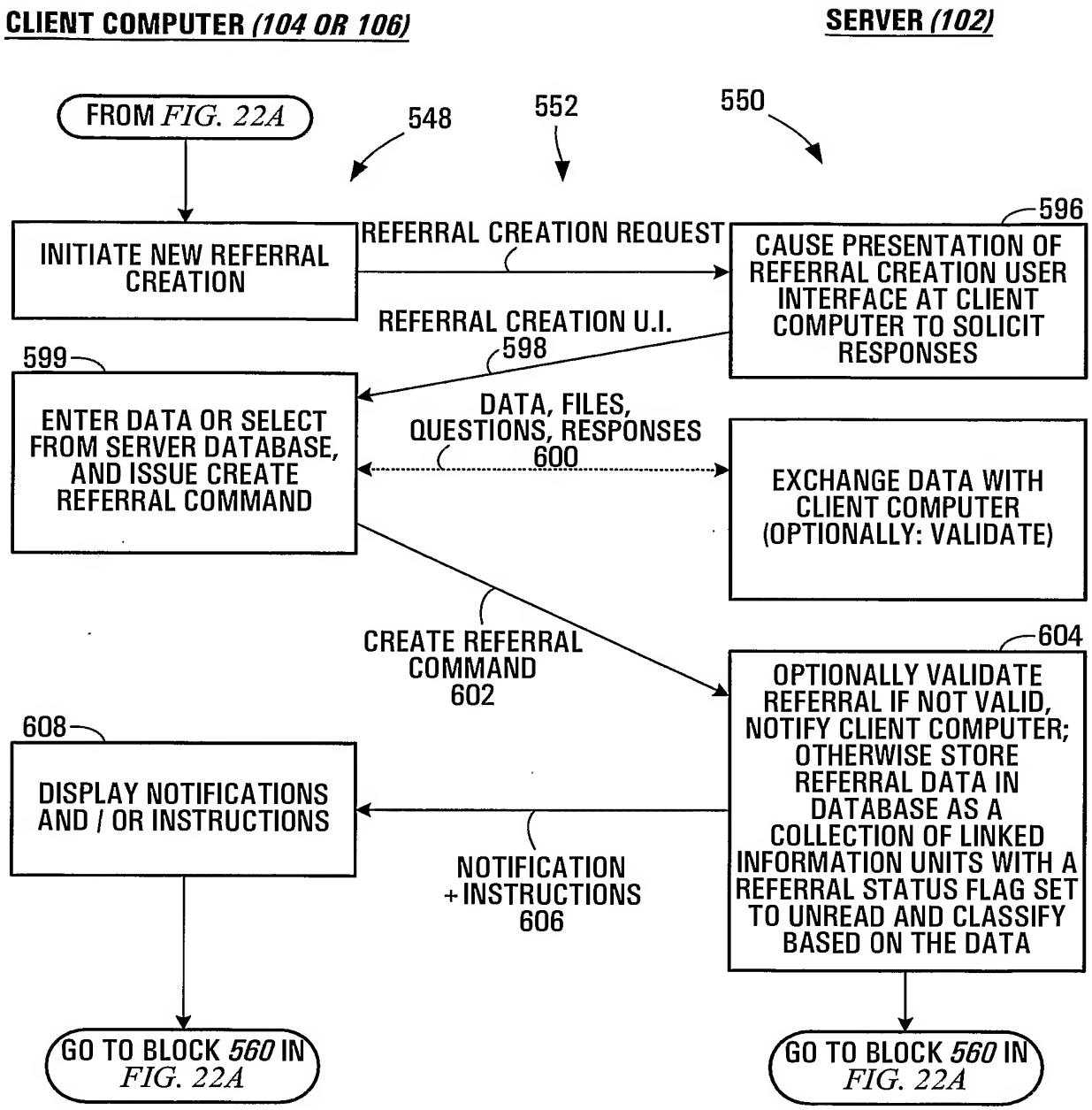
CLIENT COMPUTER (104 OR 106)
SERVER (102)
FROM FIG. 22A
548
552
550
INITIATE NEW REFERRAL CREATION
REFERRAL CREATION REQUEST
596
CAUSE PRESENTATION OF REFERRAL CREATION USER INTERFACE AT CLIENT COMPUTER TO SOLICIT RESPONSES
REFERRAL CREATION U.I.
598
599
ENTER DATA OR SELECT FROM SERVER DATABASE, AND ISSUE CREATE REFERRAL COMMAND
DATA, FILES, QUESTIONS, RESPONSES
600
EXCHANGE DATA WITH CLIENT COMPUTER (OPTIONALLY: VALIDATE)
CREATE REFERRAL COMMAND
602
604
OPTIONALLY VALIDATE REFERRAL IF NOT VALID, NOTIFY CLIENT COMPUTER; OTHERWISE STORE REFERRAL DATA IN DATABASE AS A COLLECTION OF LINKED INFORMATION UNITS WITH A REFERRAL STATUS FLAG SET TO UNREAD AND CLASSIFY BASED ON THE DATA
608
DISPLAY NOTIFICATIONS AND / OR INSTRUCTIONS
NOTIFICATION + INSTRUCTIONS
606
GO TO BLOCK 560 IN FIG. 22A
GO TO BLOCK 560 IN FIG. 22A

FIG. 22B

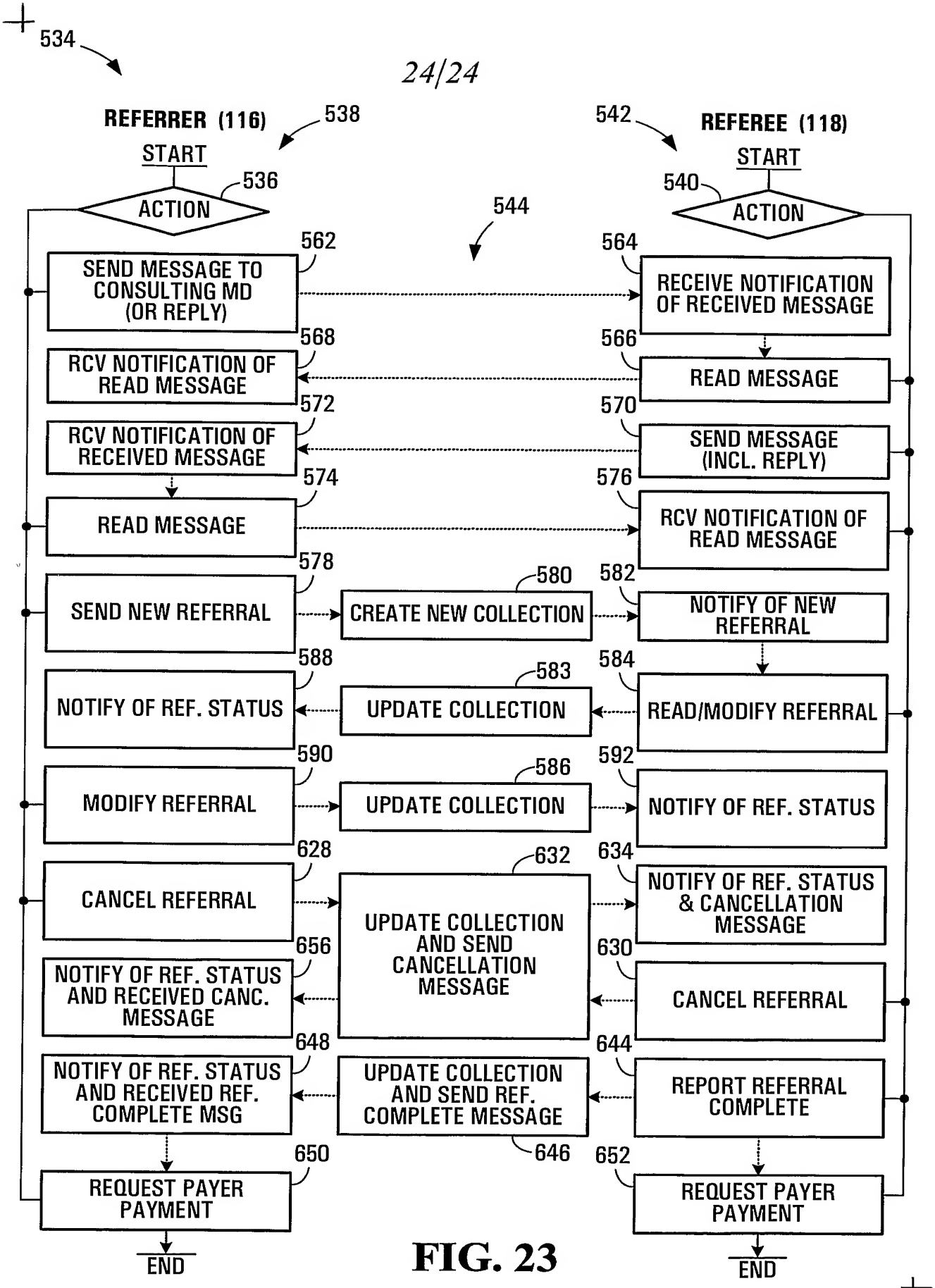
534
REFERRER (116)
538
START
ACTION
536
SEND MESSAGE TO CONSULTING MD (OR REPLY)
562
RCV NOTIFICATION OF READ MESSAGE
568
RCV NOTIFICATION OF RECEIVED MESSAGE
572
READ MESSAGE
574
SEND NEW REFERRAL
578
NOTIFY OF REF. STATUS
588
MODIFY REFERRAL
590
CANCEL REFERRAL
628
NOTIFY OF REF. STATUS AND RECEIVED CANC. MESSAGE
656
NOTIFY OF REF. STATUS AND RECEIVED REF. COMPLETE MSG
648
REQUEST PAYER PAYMENT
650
END
544
CREATE NEW COLLECTION
580
UPDATE COLLECTION
583
UPDATE COLLECTION
586
UPDATE COLLECTION AND SEND CANCELLATION MESSAGE
632
UPDATE COLLECTION AND SEND REF. COMPLETE MESSAGE
646
542
REFEREE (118)
START
540
ACTION
564
RECEIVE NOTIFICATION OF RECEIVED MESSAGE
566
READ MESSAGE
570
SEND MESSAGE (INCL. REPLY)
576
RCV NOTIFICATION OF READ MESSAGE
582
NOTIFY OF NEW REFERRAL
584
READ/MODIFY REFERRAL
592
NOTIFY OF REF. STATUS
634
NOTIFY OF REF. STATUS & CANCELLATION MESSAGE
630
CANCEL REFERRAL
644
REPORT REFERRAL COMPLETE
652
REQUEST PAYER PAYMENT
END

FIG. 23

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2004/002167

A. CLASSIFICATION OF SUBJECT MATTER

IPC[7] G06F 17/60, H04L 12/16

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC[7] G06F 17, G06F 19, H04L 12

Documentation searched other than minimum documentation to the extent that such documents are included in the fields

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms

Canadian patent database, Delphion: database?, search*, satisf*, meet*, criteri*, requirement*, display*, access*, modif*, updat*, remote*, view*, read*, entry, entries, record?, referral?, referrer?

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant	Relevant to claim No(s).
X	CA 2406738 A1 (PAPANDREAS et al.) 25 October 2001 (25-10-2001) Entire document	1-76
X	Londergan et al., *Lotus Notes Release 4 For Dummies* (Foster City: IDG Books Worldwide, 1996) Entire document	1-76
X	WO 01/52153 A1 (RAVEIS) 19 July 2001 (19-07-2001) Entire document	1-76
A	CA 2309052 A1 (JOHNSON) 06 May 1999 (06-05-1999) Entire document	1-76

[ ] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents :
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 February 2005 (16-02-2005)	23 March 2005 (23-03-2005)
Name and mailing address of the ISA/CA *Canadian Intellectual Property Office* *Place du Portage I, C114 - 1st Floor, Box PCT* *50 Victoria Street* *Gatineau, Quebec K1A 0C9* Facsimile No: 001(819)953-2476	Authorized officer Leigh Matheson (819) 997-1425

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

Patent document cited in search report	Publication date	Patent family members	Publication date
CA 2406738 A1	25-10-2001	AU 4990701 A	30-10-2001
		EP 1282874 A1	12-02-2003
		WO 01/80117 A1	25-10-2001
WO 01/52153 A2	19-07-2001	AU 0119480 A5	18-06-2001
		AU 0129437 A5	24-07-2001
		CA 2393867 A1	14-06-2001
		EP 1252593 A2	30-10-2001
		US 2001/0047282 A1	29-11-2001
		US 2002/0046159 A1	18-04-2002
		US 2002/0049624 A1	25-04-2002
		US 6321202 B1	20-11-2001
		WO 01/43023 A2	14-06-2001
CA 2309052 A1	06-05-1999	AU 9685498 A1	17-05-1999
		EP 1025528 A1	09-08-2000
		WO 99/22330 A1	06-05-1999